EPA Superfund Record of Decision:

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Record Of Decision for Operable Unit 1

Site 1, Fishing Point Landfill and Site 12, Rifle Range Landfill

Naval Air Station Paxtuxent River Patuxent River, Maryland



Engineering Field Activity Chesapeake Naval Facilities Engineering Command

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Acronyms and Abbreviations

ARAR Applicable or Relevant and Appropriate Requirement

bgs below ground surface

BTAG Biological Technical Assistance Group

CDI chronic daily intake

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act of 1980

CFR Code of Federal Regulations
COMAR Code of Maryland Regulations
COPC chemicals of potential concern
CRDL contract-required detection limit

DDD dichloro diphenyl. dichloroethane DDE dichloro diphenyl dichloroethylene DDT dichloro diphenyl trichloroethane

EE/CA Engineering Evaluation/Cost Analysis EPA U.S Environmental Protection Agency

ERA ecological risk assessment

ESD Explanation of Significant Differences

FS feasibility study

H hazard index H hazard quotient

IAS Initial Assessment Study
IR Installation Restoration
IRI Interim Remedial Investigation

LOAEL lowest observed adverse effects level
LUCAP Land Use Control Assurance Plan
LUCIP Land Use Control Implementation Plan

 μ g/kg micrograms per kilogram μ g/L micrograms per liter

MCL Maximum Contaminant Level

MDE Maryland Department of the Environment

msl mean sea level

NAS Naval Air Station

NCP National Oil and Hazardous Substances Pollution Contingency Plan

NOAEL no observed adverse effects level

NPL National Priorities List

O&M operations and maintenance

OU Operable Unit

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Acronyms and Abbreviations

PAH polynuclear aromatic hydrocarbon

PCB polychlorinated biphenyl POL petroleum, oil, and lubricants

ppb parts per billion

PPE personal protective equipment

ppm parts per million

PRAP Proposed Remedial Action Plan

RAB Restoration Advisory Board RAO remedial action objective RBC risk-based concentration

RCRA Resource Conservation and Recovery Act

RDA recommended daily allowances RFA RCRA Facilities Assessment

RfD reference dose RI remedial investigation ROD Record of Decision

SARA Superfund Amendments and Reauthorization Act of 1986

SDWA Safe Drinking Water Act

SF slope factor

SVOC semivolatile organic compound

TAL target analyte list
TBC to be considered
TCL target compound list

USC United States Code

VOC volatile organic compound

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1.0 Declaration

1.1 Site Name and Location

This Record of Decision (ROD) addresses contaminated soil and groundwater at Sites 1 and 12 (Fishing Point and Rifle Range Landfills, and adjacent areas), located at Patuxent River Naval Air Station (NAS) in St. Mary's County, Maryland.

1.2 Statement of Basis and Purpose

This Decision Document presents the selected remedy for contaminated soil and groundwater at Sites 1 and 12, Patuxent River NAS (National Superfund Database number MD 7170024536). The selected remedy addresses Operable Unit 1 (OU-1), which comprises soil and groundwater at Site 1 and Site 12 and the surface water and sediment in the Patuxent River adjacent to the sites.

The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for the Fishing Point and Rifle Range Landfill Sites.

The United States Department of the Navy (Navy) and the United States Environmental Protection Agency (EPA) Region III issue this decision document jointly. The State of Maryland concurs with the selected remedy for Fishing Point and Rifle Range Landfill Sites OU-1 (see Appendix A). Public comments are discussed in Section 3.0, "Responsiveness Summary."

1.3 Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

1.4 Description of the Selected Remedy

The selected remedy presented in this ROD addresses soil and groundwater (OU-1) at Sites 1 and 12. The remedy is part of a comprehensive environmental remediation currently being conducted under the CERCLA program. The major components of the selected remedy for OU-1 include the following:

• Installation of a soil cover over the Fishing Point Landfill (Site 1) and Rifle Range Landfill (Site 12). The soil cover will consist of a minimum of 6 inches of topsoil

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overlain by a minimum of 18 inches of clean vegetative support material. Soil for the base of the soil cover will be obtained from the area east of the Fishing Point Landfill.

- Excavation and offsite disposal of construction debris from a ravine adjacent to Rifle Range Landfill.
- Shoreline stabilization on the northwest comer of the landfills to prevent erosion of the Fishing Point Landfill, protect the soil cover, and maintain access to the western beach for recreational use. Stabilization and erosion control measures will preserve habitat along the shoreline to the extent possible, and will maintain access to the western beach for recreational use.
- One-for-one mitigation of approximately 3.6 acres of emergent wetlands, eliminated or disturbed as the result of installing the soil cover over Sites 1 and 12, either onsite or elsewhere on the NAS.
- Land use restrictions to prevent future disturbance of the landfill contents at Sites 1 and 12 beneath the soil cover.
- Five-year reviews at Sites 1 and 12. Long-term monitoring will be conducted to track future contaminant migration and data will be evaluated during the 5-year site reviews.
- An operation and maintenance (O&M) plan for Sites 1 and 12 will consist of monitoring and
 maintenance of the stormwater management system, vegetation cover, and erosion control
 structures. Groundwater monitoring will be conducted using the existing onsite monitoring wells or
 replacement monitoring wells. Landfill gas will be collected through a passive gas collection system
 and vented to the atmosphere.

After completing the Feasibility Study (FS) for Sites 1 and 12, a decision was made among the Navy, EPA, and Maryland Department of the Environment (MDE) to designate the marsh area west of Site 12 as a separate OU (OU-2) from the remainder of the Fishing Point and Rifle Range Landfill Sites. The decision was made because (1) the marsh contains a different contaminated medium (sediment) than the other Fishing Point and Rifle Range Landfill sites covered under OU-1, and (2) the marsh requires further study to quantify the potential ecological risks and need for remedial action. A remedy for the marsh will be considered at a later date following the completion of an ecological study of the area.

1.5 Statutory Determinations

The remedy for Sites 1 and 12, OU-1, selected by both EPA and the Navy with State of Maryland concurrence, is protective of human health and the environment. The selected remedy complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action. For the selected remedy, MDE has granted a variance from the State of Maryland's final cover design specifications for solid waste landfill closure (COMAR 26.04.07). The variance is justified because a soil cover would prevent contact of human and ecological receptors with landfill debris as effectively as a Resource Conservation and Recovery Act (RCRA) Subtitle D cap. Additionally, there are no current or reasonable future exposure pathways to shallow groundwater for human or environmental receptors because if groundwater pumping were to occur, surface water intrusion from the Patuxent River would result in a Class III aquifer. In addition, a RCRA

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Subtitle D cap would not prevent groundwater from being in direct contact with landfill waste, since the water table is primarily controlled by the water level of the Patuxent River and not by the amount of surface water infiltration. Therefore, a RCRA Subtitle D cap would not reduce risks to human health or the environment to a substantially greater extent than a soil cover. Groundwater would continue to be monitored under the selected alternative to ensure that contaminant levels do not increase significantly over current concentrations.

The selected remedy is cost effective, and it uses permanent solutions. However, because treatment of the principal threats to OU-1 was not found to be practicable, the selected remedy does not satisfy the statutory preference for treatment as a principal element. Treatment was found to be cost-prohibitive due to the large quantity of landfill material at Sites 1 and 12.

Because the selected remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted every 5 years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. The review will be consistent with Section 121(c) of CERCLA, 42 United States Code (USC) Section 9621 (c).

1.6 ROD Data Certification Checklist

Table 1-1 provides a summary of key remedy selection information contained in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for Sites 1 and 12.

TABLE 1-1ROD Data Certification Checklist
NAS Patuxent River, Sites 1 and 12

Remedy Selection Information	Reference
Chemicals of concern and their respective concentrations	Section 2.5.3
Baseline risk represented by the chemicals of concern	Sections 2.7.1 and 2.7.2
Cleanup levels established for chemicals of concern and the basis for these levels	Sections 2.7.1 and 2.7.2
Approaches taken to address source materials constituting principal threats	Section 2.11
Current and reasonably anticipated future land use assumptions and Current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD	Sections 2.7.1 and 2.7.2
Potential land and groundwater use that will be available at the site as a result of the selected Remedy	Section 2.12.4
Estimated capital, annual O&M, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are protected	Section 2.12.3
Key factor(s) that led to selecting the remedy	Section 2.12.1

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1.7 Authorizing Signatures and Support Agency Acceptance of the Remedy

This ROD represents the selection of a remedial action under CERCLA for Sites 1 and 12, OU-1. The foregoing represents the selection of a remedial action by the United States Department of the Navy and the United States Environmental Protection Agency with the concurrence of the Maryland Department of the Environment.

2/8/00

United States Department of the Navy

By: Date:

Captain Paul Roberts, USN Commanding Officer Naval Air Station

Patuxent River, Maryland

United States Environmental Protection Agency

By: | Chen Feet | Date: 2/8/00

Abraham Ferdas, Director Hazardous Site Cleanup Division (3HS00) U.S. Environment Protection Agency, Region III Philadelphia, Pennsylvania

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2.0 Decision Summary

2.1 Site Name, Location, and Description

This Record of Decision (ROD) presents the United States Department of the Navy's selected remedial actions for Operable Unit 1 (OU-1), which comprises soil and groundwater at Fishing Point Landfill (Site 1) and Rifle Range Landfill (Site 12) and adjacent areas at Patuxent River NAS Sites 1 and 12. The NAS is located in St. Mary's County in southern Maryland, at the confluence of the Patuxent River and Chesapeake Bay (Figure 2-1; see figures following page 2-27). Fishing Point is located in the north-central part of the NAS (Figure 2-2), along the Patuxent River, west of Harper's Creek and northwest of Cedar Point Road.

The Navy and the United States Environmental Protection Agency (EPA) are the lead agencies involved in the remedial process for Sites 1 and 12. The Maryland Department of the Environment (MDE) serves as a support agency. The National Superfund Database identification number for NAS Patuxent River is MD 7170024536. Funds required for remediating Sites 1 and 12 originate from the Environmental Restoration, Navy funds.

Site 1, Fishing Point Landfill, consists of approximately 23 acres and is located along the shoreline of the Patuxent River, west of Harper's Creek. Surface elevations at Site 1 range from mean sea level (msl) along the shoreline to 40 feet above msl at the northeastern comer of the site. Most of the northwestern half of the site is a low, flat meadow with elevations ranging between 5 and 10 feet above msl. East of this area, the land surface rises steeply to a flat, wooded area at elevations ranging between 30 and 40 feet above msl.

Site 12, the Rifle Range Landfill, consists of approximately 2.2 acres and is located immediately south of Fishing Point Landfill, between the old rifle range and Fishing Point Landfill. The site slopes towards the west with elevations up to 15 feet above msl occurring along the eastern edge of the site. Steep ridges reaching 35 feet above msl occur to the south and southeast of the site. Most of the site is between 4 feet above msl and 10 feet above msl.

For site characterization purposes, Sites 1 and 12 were divided into six areas, each with distinct physical characteristics and contaminant types and levels. The six areas are designated by the letters "A" through "F", and are shown on Figure 2-3. Area A is a concrete rubble and reinforcing steel disposal area. Areas B and D correspond to the Fishing Point and Rifle Range landfills. Area C is comprised of surface debris in a ravine. Area E corresponds to a marsh area southwest of the fill areas. Area F is a grassy area east of the fill areas.

OU-1 consists of soil and groundwater in Areas A, B, C, D, and F and surface water and sediment in the Patuxent River adjacent to the sites. Area E is not included in this operable unit, but it will be addressed at a later date following the completion of additional ecological study in the area.

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2.2 Site History and Enforcement Activities

The history of Sites 1 and 12, previous site investigations, and highlights of community participation are summarized below.

2.2.1 History of Site Activities

The unlined landfill at Site 1 was used to dispose of liquid and solid wastes generated by the base from 1960 to 1974. Wastes included petroleum, oil, and lubricant (POL) products; construction debris; sewage treatment plant sludges; paints; solvents; antifreeze solution; pesticides; miscellaneous station wastes; and residues from burning these materials. Most of the liquid wastes were deposited in the form of contaminated rags or residues in cans. Some wastes were reportedly burned in pits at the site before burial to reduce their volume. The landfill was not officially closed under State of Maryland solid waste regulations; however, a minimal soil cover was added on top of the waste materials.

Site 12 was used from the mid-1950s until 1960. Trash and construction debris were deposited at the site. The landfill was not officially closed under State of Maryland solid waste regulations; however, a minimal soil cover was added on top of the waste materials.

In 1990, approximately 6 inches of wastewater treatment plant sludge from St. Mary's County was applied to Area F, the hillside located east of Site 1, as approved by the State of Maryland.

In 1993, the northern shoreline of Fishing Point was stabilized to prevent erosion from the site. Stone breakwaters were installed to reduce the energy of waves hitting the beach, and beach fill (sand) was used to extend the beach along the downgradient edge of the landfill. The current northern beach at Fishing Point consists entirely of clean fill brought in during the beach stabilization effort and subsequent deposition resulting from the stabilizing action of the breakwaters.

2.2.2 Summary of Previous Investigations

The following summarizes the activities of previous investigations at Site 1 and Site 12. Results of the previous investigations are discussed in Section 2.5 of this ROD.

Initial Assessment Study (IAS). The first investigation of Sites 1 and 12 was the IAS conducted in 1984. The IAS included a preliminary evaluation of potentially contaminated sites at the NAS. The IAS showed that 14 sites, including Site 1, required further evaluation to verify whether a problem existed at the sites. Site 12 was not recommended for further study because of the inert nature of materials believed to be disposed there.

Confirmation Study II. A confirmation study was conducted at Site 1 in 1985. Groundwater, surface water, and sediment samples were collected.

RCRA Facilities Assessment (RFA), Revised Phase II Report. As part of the Resource Conservation and Recovery Act (RCRA) process, in 1989 a review was conducted of NAS sites where hazardous waste was managed.

Engineering Evaluation/Cost Analysis (EE/CA). In 1992, an EE/CA was prepared to evaluate interim remedial alternatives to stabilize the eroding north shoreline of the landfill.

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Specifications for the Construction of Shoreline Improvements on the Chesapeake Bay and the Patuxent River. Technical specifications were prepared in 1992 for the construction of shoreline erosion control measures.

Technical Memorandum for Site Investigation at Fishing Point Landfill. Two corroded drums were opened and sampled in 1993. Soil samples were collected from around the drums. Composite samples were collected from the concrete debris along the shoreline. This Technical Memorandum is an appendix to the Interim Remedial Investigation referenced below.

Interim Remedial Investigation (IRI). The IRI was completed in 1994. Groundwater samples were collected. In addition, hydraulic conductivity tests were conducted and long-term water-level measurements were collected.

Remedial Investigation (RI), Sites 1 and 12. Additional wells were installed at Sites 1 and 12 in 1996 and 1997. Groundwater, surface water, sediment, and soil samples were collected. The investigation determined that there was potential human health risk from recreational exposure to surface water in the marsh west of Site 12. Potential ecological risk was identified from metals in marsh surface water, and from metals and pesticides in marsh sediment. The investigation also identified potential human health risk in the unlikely event that shallow drinking water wells would be installed in the narrow strip of land between the landfill and the Patuxent River.

Feasibility Study (FS), Sites 1 and 12. An FS was prepared in 1998 to: (1) provide the basis for the remedial action at Sites 1 and 12; (2) evaluate and screen remedial technologies; and (3) develop and evaluate remedial action alternatives based on a presumptive remedy for landfill sites (containment). Additional sediment and soil samples also were collected. The results of the alternatives evaluation are discussed in this ROD.

2.2.3 Summary of Enforcement Actions

No enforcement actions have been taken at Sites 1 and 12. The Navy has owned the property since the early 1940s, and has been identified as the responsible party.

On June 30,1994, NAS Patuxent River was placed on the National Priorities List (NPL). The NPL is the nationwide list, developed by EPA, which identifies sites covered under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) regulations for priority investigation and remedial action.

2.3 Community Participation

The proposed remedial action for Sites 1 and 12, described in the FS and the Proposed Remedial Action Plan (PRAP), was released to the public on November 1, 1999. The public comment period for this document was held from November 1 to November 30,1999. A public meeting was conducted on November 9, 1999 at the Frank Knox Training Center, located at NAS Patuxent River. A copy of the PRAP Notice of Availability and the transcripts of the public meeting are provided in Appendix B. During presentations to the Restoration Advisory Board (RAB) on the FS, future land use options were discussed.

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The PRAP, as well as other technical documents related to Sites 1 and 12, were placed in the Administrative Record at the following libraries:

Lexington Park Public Library Patuxent River Naval Air Station Library

1 Coral Place Cedar Point Road

Lexington Park, Maryland 20653 Patuxent River, Maryland 20670

All public participation requirements are consistent with CERCLA sections 113 (k) (2) (B) (i-v) and 117.

2.4 Scope and Role of Response Action at Sites 1 and 12, OU-1

Site 1 and Site 12 are two of 46 Installation Restoration (IR) sites located at NAS Patuxent River. Past disposal activities at the landfills have primarily impacted soil, groundwater, and sediment in the vicinity of Sites 1 and 12.

This ROD addresses OU-1, the first of two operable units at Sites 1 and 12. OU-1 consists of contaminated soil and groundwater in Areas A, B, C, D, and F and the surface water and the sediment in the Patuxent River adjacent to the sites. Contaminated surface water and sediment in Area E (OU-2) will be addressed at a later date, following the completion of an ecological study in the area. After the investigation is completed, the Navy will propose a preferred remedy for OU-2. The response action at OU-1 is the major component of the final remedy at Sites 1 and 12 and will be consistent with any action necessary at OU-2.

A removal action was conducted in 1993 to stabilize the northern shoreline of Fishing Point, thereby preventing landfill materials from eroding into the Patuxent River. The remedial action described in this ROD will further stabilize the shoreline, in addition to covering the landfill to prevent direct exposure to landfill contents.

OU-1 is a landfill that has the basic characteristics of a municipal landfill as defined by EPA. Because municipal Landfills have similar characteristics, EPA has identified selected remedies that are usually appropriate to address risks found at municipal landfills. Presumptive remedies were developed by EPA to streamline site investigation and the selection of cleanup methods for certain categories of sites by narrowing the consideration of cleanup methods or treatment technologies or remediation approaches that have a proven track record in the Superfund program. EPA and the Navy have determined that it is appropriate to apply the presumptive remedy for municipal landfills at this OU based on the types of waste found at the site and guidance provided in the directive, *Presumptive Remedy for CERCLA Municipal Landfill Sites* (EPA 540-F-93-035, September 1993). MDE supports the presumptive remedy approach.

The selected remedy for OU-1, presented in Section 2.12, will reduce the potential risk to human health and the environment associated with surface soils and subsurface soils at Sites 1 and 12. The remedy will provide effective source control and reduce the potential for contaminant migration. A vegetated soil cover is included in this remedy to reduce potential exposure to contaminated soil. Additionally, it is expected that the remedy will lower infiltration somewhat, thereby reducing the contamination migration to groundwater. To monitor contaminant migration over time, groundwater monitoring will be conducted. Landfill gas will be collected in a passive gas collection system and vented to

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the surface. Land use restrictions will be implemented to prevent future disturbance of the landfill contents beneath the soil cover.

2.5 Site Characteristics

This section provides a summary of site features; sources, nature, and extent of contamination; and contaminant fate and transport. Additional detail is provided in the RI report (CH2M HILL, 1998).

2.5.1 Site Conceptual Model

The primary site features at Sites 1 and 12 consist of fill areas (Areas B and D, the Fishing Point and Rifle Range landfills), a concrete and reinforcing steel disposal area (Area A), a wooded ravine littered with surface debris (Area C), a marsh (Area E), and a hillside (Area F) east of the Fishing Point Landfill. The site is bounded to the north and west by the Patuxent River, and groundwater is generally present within 5 feet below ground surface (bgs). Major features of Sites 1 and 12 are described below.

2.5.1.1 Landfills

The lateral extent of the Fishing Point and Rifle Range landfills was delineated based on the results of a geophysical investigation conducted in 1998. Landfill boundaries are displayed in Figure 2-3. Test pits completed in each landfill indicated a shallow (less than 12-inch) layer of soil covering the waste material in many areas. Contents found in the landfills included scattered construction debris, unburned domestic refuse, burned debris, and charred metal and glass objects. Empty metal debris, including cabinets, desks, playground equipment, paint cans, and rusting 55-gallon drums, were also observed. Fill material is not continuous across the site, indicating that some areas were not used for trash disposal. Trash thickness observed during the RI was between 5 and 12 feet.

2.5.1.2 Surface Water Features

The primary surface water feature in the vicinity of Fishing Point is the Patuxent River, which borders the site to the west and north. Approximately 2.6 acres of emergent wetlands, dominated by the common reed (*Pliragmites australis*), are present on top of Site 1. Although most of the surface drainage from Site 1 flows towards the northwest into the Patuxent River, surface water ponds develop on Site I due to the impermeability of the soils and poor drainage away from the landfill. Site 12, located immediately south of Site 1, grade's toward the west into a 3.5-acre wetland designated as Area E. During a wetlands delineation conducted by CH2M HILL in January 1998, no outlets from the wetland were found, and no direct connectivity between the wetland and the Patuxent River was observed.

2.5.1.3 Groundwater Features

Shallow groundwater is present in an unconfined aquifer with a water level ranging from 3 to 4 feet below ground surface.

The uppermost 100 feet of soil underlying Sites 1 and 12 consist of unconsolidated gravel, sand, silt, and clay. These units, in order of increasing depth, are:

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- The Lowland Deposits, consisting of orange or gray sand, silty sand, and gravely sand with a total thickness of 45 to 65 feet;
- The St. Mary's Formation, a dark greenish-gray sand, silty sand, and sandy silt with abundant oyster shell hash (not present at all locations). The St. Mary's Formation can be up to 80 feet thick, although none of the monitoring well borings penetrated the entire thickness of this formation at Sites 1 and 12;
- An olive-gray silt and clay unit of the St. Mary's Formation.

A discontinuous silty sand layer occurs in the upper 6 feet within the Lowland Deposits. This surficial silty sand unit is absent on some steep grades. Another discontinuous 10- to 15-foot-thick silty sand layer occurs at mid-depth within the Lowland deposits. This layer thins out near Cedar Point Road on the southeast and beneath the low, flat area on the northwest portion of Fishing Point Landfill. The St. Mary's olive-gray silt and clay unit is approximately 20 feet higher in upland areas than in the low, flat area near the river.

The upper St. Mary's Formation is sufficiently permeable to transmit groundwater flow, and it is in direct hydraulic connection with the surficial deposits at the site. For this reason, the upper St. Mary's Formation and the Lowland deposits function together as the surficial aquifer at Sites 1 and 12.

Despite the presence of silt and clay in the units described above, there do not appear to be any continuous low-permeability confining units in the upper 60 to 90 feet of sediment at Sites 1 and 12. Hence, groundwater is unconfined down to the bottom of the monitoring well network.

The average linear horizontal groundwater velocity in the Lowland Deposits at Fishing Point is estimated at 80 to 130 feet per year. The average linear velocity within the upper portion of the St. Mary's Formation at Fishing Point is approximately 20 to 30 feet per year, due to the lower hydraulic conductivity in this unit. The general groundwater flow direction at Sites 1 and 12 appears to be west and north toward the Patuxent River. There appears to be little horizontal flow in the shallow aquifer east towards Harper's Creek from the landfills at Sites 1 and 12.

Near-shore upward flow potentials are consistent with the typical pattern of groundwater flow discharging into a major waterway like the Patuxent River. Groundwater discharge from both the Lowland deposits and the St. Mary's Formation would be expected to flow into the Patuxent River.

Based on an analytical groundwater flow model for Sites 1 and 12, a groundwater production well installed in the shallow aquifer would result in intrusion of brackish river water into the shallow aquifer to a distance of 100 to 150 feet from shore. Such brackish-water intrusion would result in a Class III designation for shallow groundwater downgradient of the landfill, indicating that the water is not suitable for potable use.

2.5.1.4 Site Ecology

Both plant and animal life inhabit Sites 1 and 12 and their surrounding areas. The sites were previously used for landfilling and are covered by sparse, herbaceous plant species. Aquatic systems (habitat for fish and invertebrate species) include an intermittent stream

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that runs along the south side of Site 1 before emptying into the Patuxent River and the shoreline and beaches along the Patuxent River. The northern shoreline is relatively shallow with depths of 2 to 4 feet within 100 feet of the beach. The western shoreline drops off rapidly and attains depths of as much as 30 feet within 100 feet of the beach. The Patuxent River is brackish in the vicinity of the NAS. Approximately 3.5 acres of palustrine emergent, scrub /shrub, and forested wetlands are located between the beach and Site 12. Upland slopes adjacent to Site 12 contain arboreal vegetation.

A total of 2.6 acres of emergent wetlands are located in isolated areas on Site 1. They are dominated by common reed (*Phragmites australis*) with soft rush, bulrush, and Canada rush also present. The soil is mainly compacted sand and fill with poor permeability.

Birds, reptiles, amphibians, and mammals use the site and its surrounding habitats. The RI report (CH2M HILL, 1998) documents the specific herbaceous plant species, aquatic species, birds, reptiles, and amphibians that have been identified on Sites 1 and 12.

2.5.2 Sources of Contamination

The boundaries of Sites 1 and 12 landfills, delineated by a geophysical investigation, are displayed in Figure 2-3. The test pit investigation, undertaken as part of the RI, characterized the landfill contents as construction debris, unburned domestic refuse, burned debris, and charred metal and glass objects, as well as specific widely-scattered items such as a syringe, a medicine bottle, cabinets, desks, playground equipment, paint cans, and empty 5-gallon drums.

Sites 1 and 12 are municipal landfills in which co-disposal of hazardous and municipal waste occurred, but the location of highly toxic and/or mobile material is not known. Although the waste materials in Sites 1 and 12 were not sampled for chemical analysis, the source areas of contamination are assumed to be distributed throughout these landfills.

In 1990, a permitted application of wastewater treatment plant sludge from St. Mary's County was deposited on the former soil borrow area east of Site 1 (Area F). The sludge was applied to provide organic material so that the area could be revegetated. Such sludge generally contains elevated concentrations of inorganic compounds, including heavy metals. The sludge material is believed to be the source of elevated inorganic chemical concentrations measured in areas outside the landfill footprints.

2.5.3 Nature and Extent of Contamination

Based on the previous site investigation and RI findings, waste materials disposed at Sites 1 and 12 have impacted groundwater, marsh surface water, and marsh sediment. The investigations at Sites 1 and 12 were developed using EPA's guidance on presumptive remedies for municipal landfills. According to this guidance, containment alternatives, for example, covering the site to prevent contact, are accepted remedies for landfills. Therefore, it was determined that it was not necessary to sample landfill wastes. The investigations to characterize the landfills focused on media impacted by the migration of contamination. The results of the investigations are summarized in the following subsections.

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2.5.3.1 Soil Gas

Soil-gas measurements were collected below ground during the RI to determine whether significant concentrations of methane and total volatile organic compounds (VOCs) were being produced by landfilled debris. Methane was detected at 4 locations, both at Site 1 and at Site 12, at between 1 percent and 34 percent by volume. The highest concentrations of methane were detected at Site 12 (25 to 34 percent by volume). Significant concentrations (up to 16 percent) also were detected in the northeastern portion of Site 1. No VOCs were detected in soil gas at either Site 1 or Site 12.

2.5.3.2 Groundwater

Concentrations of several analytes detected in groundwater exceeded federal Maximum Contaminant Levels (MCLs) for drinking water. Out of 19 groundwater monitoring wells sampled during the RI, four metals and one volatile organic compound were found to exceed MCLs. The locations of monitoring wells at Sites 1 and 12 are identified in Figure 2-3.

Antimony, cadmium, nickel, and thallium were each detected in at least one monitoring well at levels exceeding their respective MCLs. However, antimony and thallium were present at similar levels in the background monitoring well, 1MW-5B. Antimony was detected at 6.1 micrograms per liter (μ g/L) to 8 μ g/L in wells along the shore (lMW-1B, 1MW-3A, 1MW-3B, 1MW-4B, 1MW-12, and 12MW-1), and at 8.5 μ g/L in the background well 1MW-5B. Thallium was detected at estimated concentrations of 2.4 to 2.9 μ g/L in wells along the shoreline (lMW-3A, 1MW-7A, 1MW-8, 1MW-12) and at 2.2 to 3.7 μ g/L, respectively, in the background wells 1MW-5B and 1MW-5A. Cadmium and nickel were present above background levels but exceeded MCLs only in one well, 1MW-7B, located near the downgradient edge of the landfill. Total (unfiltered) cadmium was detected in this well at 11 μ g/L, compared to an MCL of 5 μ g L. Total nickel was detected at 118 μ g/L, compared to an MCL of 100 μ g/L.

Chlorobenzene was detected in well 1MW-6, along the downgradient edge of the landfill, at a concentration of 130 μ g/L, as compared to an MCL of 100 μ g/L.

2.5.3.3 Surface Water

During the RI and again in Spring 1998, surface wafer samples were collected from the Patuxent River and Area E, the marsh located west of Site 12. Surface water sampling locations are identified in Figure 2-4. Because surface water in the marsh is not part of OU-1, marsh water quality is not discussed in this ROD.

No organic chemicals were detected in river surface water samples. Inorganic chemicals detected at the highest concentrations were those associated with brackish or salt water (calcium, magnesium, potassium, and sodium). Several additional inorganic chemicals, such as aluminum (5 of 5 samples), arsenic (4 of 5 samples), iron (5 of 5 samples), and zinc (5 of 5 samples), were also detected in some of the river surface water samples at levels that do not pose a significant risk to human health. Inorganic chemical concentrations detected in surface water were similar to background levels in the Patuxent River.

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2.5.3.4 **Sediment**

During the RI and again in the Spring of 1998, sediment samples were collected from the Patuxent River and the Area E marsh. Sediment sample locations are shown in Figure 2-4.

Sediment collected from the river contained little evidence of contamination. Organic compounds were detected in some samples at low concentrations. Dichloro diphenyl trichloroethane (DDT) and its degradation products (dichloro diphenyl dichloroethane [DDD] and dichloro diphenyl dichloroethylene [DDE]) were detected in one sample along the western side of the landfill at approximately 10 micrograms per kilogram (μ g/kg) each, while DDT alone was detected at a second location along the western side of the landfill at approximately 2 μ g/kg. Two polynuclear aromatic hydrocarbons (PAHs), fluoranthene and pyrene, were detected in one sample along the north side of the landfill. Analytical results indicate the possible presence of 4-methylphenol in six of the 21 sediment samples scattered along the west and north sides of the landfill, at concentrations below the contract-required detection limit (CRDL) ranging from approximately 51 μ g/kg to approximately 250 μ g/kg. There was no pattern to inorganic concentrations in river sediment.

Additional information about marsh sediment will be collected during an upcoming ecological study of the area. Since sediment in Area E is not included in OU-1, sediment samples from this Area are not discussed in this ROD but will be addressed as part of OU-2.

2.5.3.5 Soil

During the RI, surface soil samples were collected around the Fishing Point and Rifle Range landfills, primarily in Area F. Samples of waste material in the landfills were not analyzed for chemical constituents, since contamination in the landfills was assumed to exist throughout the landfill footprints. This approach is consistent with the use of a presumptive remedy for municipal landfills, since the entire landfill site will be covered to prevent contact with materials that are presumed contaminated.

In April 1998, additional soil samples were collected to further characterize the extent of inorganic contamination that posed a potential for ecological risk at the site. Five surface soil samples and three deep samples (collected between 2.5 to 3 feet bgs) were collected and analyzed for target analyte list (TAL) metals and cyanide. Locations of soil samples collected during the RI and in April 1998 are displayed in Figure 2-5.

Elevated concentrations of inorganics in Area F are the result of a wastewater treatment plant sludge application, permitted by MDE, that occurred in 1991.

Outside Area F, several PAHs were detected in two samples (1SS-11 and 1SS-12), collected in Area A, at concentrations that slightly exceeded conservative ecological risk screening criteria, described later in this ROD. In addition to PAHs, DDE and DDT were detected in one soil sample (12SS-2), collected immediately east of Site 12, at concentrations exceeding ecological screening criteria.

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2.5.4 Contaminant Fate and Transport

The source areas of contamination at Sites 1 and 12 are distributed throughout the landfills. The source of contamination detected in Area F is wastewater treatment plant sludge that was applied in 1991.

Contaminants identified in soil and sediment generally have very low mobility. Inorganics tend to adsorb to inorganic clay particles or other particulate matter, and have very low solubility. PAHs also have very low solubility, and tend to strongly adsorb to organic material in soil. Pesticides such as DDE and DDT have similarly low mobility.

The contaminants listed above may be transported via surface water runoff or groundwater flow to sediment in the marsh or in the river. However, the contaminants would not likely be released into the surface water due to their strong tendency to bind to the organic and inorganic matter in soil and sediment. A hurricane or other tidal inundation with high waves could mobilize and resuspend potentially contaminated material in low-lying areas.

2.6 Current and Potential Future Land and Resource Uses

2.6.1 Land Uses

There is currently no access to, or use of, Sites 1 and 12. Following the completion of the remedial action, limited recreational use is planned for the sites. Any future recreational land use will be protective of human health and the environment. Land use restrictions will be implemented to prevent damage to the soil cover that will be placed over the waste in the Fishing Point and Rifle Range Landfills.

2.6.2 Ground and Surface Water Uses

Groundwater under Sites 1 and 12 is not used as a drinking water source. Groundwater contained in the surficial aquifer beneath the site would experience brackish water intrusion if pumped routinely, making water withdrawn from the aquifer non-potable. Because St. Mary's County prohibits installation of drinking water wells within the surficial aquifer, it is anticipated that groundwater beneath Sites 1 and 12 will not be used as a drinking water source after the implementation of remedial actions.

The Patuxent River is the primary surface water resource in the vicinity of Fishing Point. The river is currently used for recreational purposes, primarily fishing. There is currently no access to the Patuxent River from the Fishing Point area. Each of the remedial alternatives described for the ROD allow for renewed access to the Patuxent River from Fishing Point. For this reason, it is anticipated that Fishing Point will again be used for recreational access to the Patuxent River after remedial actions have been implemented at Sites 1 and 12.

2.7 Summary of Site Risks

The response action selected in this ROD is necessary to protect public health, welfare, or the environment from actual or threatened releases of hazardous substances into the environment.

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Potential human health and ecological risks associated with exposure to contaminated media at Sites 1 and 12 were evaluated as part of the RI and FS. A summary of the human health and ecological risks associated with Sites 1 and 12 are summarized below. The risk assessment results for the marsh (Area E) are not addressed in this ROD, since the marsh is not included in OU-1. The marsh will be addressed as a separate operable unit (OU-2), following the completion of an ecological study of the area.

The EPA guidance Conducting Remedial Investigationsl Feasibility Studies for CERCLA Municipal Landfill Sites (EPA/540/P-91/001) streamlines the FS process for specific classes of sites with similar characteristics, such as types of contaminants present, types of disposal practices, or how environmental media are affected. Landfill sites share similar characteristics; therefore, presumptive remedies are used to ensure consistency in remedy selection and to reduce the cost and time required to clean up similar types of sites. Sites 1 and 12 are landfills in which co-disposal of hazardous and municipal waste occurred, but the location of highly toxic and/or mobile material is not known. The presumptive remedy for such landfills is containment. Because of this classification, landfill contents were not sampled, and potential risks to human and environmental receptors from landfill materials were assumed to be present but were not quantitatively evaluated.

Additional hazards are posed to human and ecological receptors by the proximity of landfill debris to the surface. In most cases, only a thin layer of soil cover separates the landfill from humans and ecological receptors. Several areas contain exposed surface debris that could pose a physical hazard to recreational users and trespassers.

2.7.1 Summary of Human Health Risk Assessment

A baseline human health risk assessment was conducted to characterize the current and future human health risks at Sites 1 and 12 if no additional remediation were implemented. The risk assessment was prepared utilizing conservative assumptions, and all feasible exposure pathways were considered based on current site conditions and current and potential future site usage.

The human health risk assessment for Sites 1 and 12 was comprised of the following components:

- Identification of Chemicals of Potential Concern (COPCs) identified and characterized the distribution of COPCs found onsite. Chemicals identified in this screening were the focus of the subsequent evaluation in the risk assessment. COPCs were identified by comparing the maximum concentrations of chemicals in each medium (soil, surface water, sediment, and groundwater) to EPA Region III health-based criteria that were developed using current toxicity factors and exposure formulas. Human nutrient (calcium, magnesium, potassium, and sodium) concentrations also were compared to Recommended Daily Allowances (RDAs). Constituents detected in surface soil were statistically compared to background surface soil data from the NAS.
- Exposure Assessment identified potential pathways by which exposure could occur, characterized the potentially exposed populations (e.g., workers, residents, trespassers) and estimated the magnitude, frequency, and duration of exposures. The exposure pathways listed below were selected in consultation with EPA Region III. All of these pathways were quantified for potential exposure.

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The exposure scenarios under current land use included:

- Site worker: incidental ingestion of and dermal contact with surface soil, groundwater, surface water, and sediment; and inhalation of fugitive dust from surface soil.
- Trespassers playing on or walking across the site: inhalation of fugitive dust; incidental ingestion of and dermal contact with surface soil.
- Recreational users (adult and child): incidental ingestion of and dermal contact with surface water and sediment from the Patuxent River.

The future land use exposure routes included:

- Residents living on the site: inhalation of fugitive dust, incidental ingestion of and dermal contact
 with surface soil; inhalation of volatiles from groundwater while showering (adults), ingestion,
 and dermal contact with groundwater.
- Recreational users (adult and child): incidental ingestion of and dermal contact with soil, surface water, and sediment; inhalation of fugitive dust from surface soil.
- Site worker: incidental ingestion of and dermal contact with soil, groundwater, surface water, and sediment; and inhalation of fugitive dust from surface soil.
- Construction worker: inhalation of fugitive dust from, incidental ingestion of, and dermal contact with surface soil.

Direct contact with landfill wastes was not quantitatively evaluated because the presumptive remedy for landfills assumes that there is a risk due to exposure to landfill materials, and therefore landfill contents were not sampled.

- Toxicity Assessment identified the types of adverse health effects associated with exposure to COPCs along with available toxicity factors (e.g., cancer slope factors and reference dose values), and summarized the relationship between magnitude of exposure and occurrence of adverse health effects. It also identified related uncertainties (such as the weight-of-evidence of a particular chemical carcinogenicity in humans) associated with these values.
- **Risk Characterization** integrated the results of the exposure assessment and toxicity assessment to estimate the potential risks to human health. Both cancer and non-cancer human health effects were evaluated. Pathways that posed an unacceptable risk based on quantitative risk characterization were identified.
- **Uncertainty Assessment** identified sources of uncertainty associated with the data, methodology, and the values used in the risk assessment estimation.

All of the above components were evaluated following CERCLA regulations, using EPA risk assessment guidance (Risk *Assessment Guidance for Superfund*, EPA, December 1989; see table of references at the end of this document).

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For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

 $Risk = CDI \times SF$

where: risk the probability (e.g., 2 x10⁻⁵)of an individual's developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

 $SF = slope factor, expressed as (mg/kg-day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer which individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's acceptable risk range for site-related exposures is 10^{-4} to 10^{-6} .

All of the current and future carcinogenic risks for the individual pathways (ingestion, inhalation, and dermal contact) quantitatively evaluated in this assessment were below or within the EPA's acceptable risk range. The presumptive remedy for municipal landfills assumes that there is an unacceptable risk from direct contact with landfill wastes; this pathway was not quantitatively evaluated in this assessment.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI less than 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where: CDI = Chronic daily intake

RfD = reference dose

The intake and RfD are expressed in the same units and represent the same exposure period (i.e., chronic or subchronic).

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All of the current-use exposure scenarios were below the EPA's non-cancer recommended level. The only individual pathways for the future use scenario that exceeded the EPA non-cancer recommended level are:

- Ingestion of groundwater (St. Mary's formation) by the hypothetical future residential child and adult
- Ingestion of groundwater (St. Mary's formation) by the hypothetical future site worker

No hazard index was calculated for direct contact with landfill wastes because the presumptive remedy assumes that there is an unacceptable risk if humans were to be exposed to these materials. Of the media that were quantitatively evaluated, groundwater is the only media that resulted in non-cancer hazards above the EPA recommended levels. The constituents that are the non-cancer drivers for groundwater are antimony, cadmium, and manganese. Tables presenting the estimated noncarcinogenic risk for groundwater ingestion are presented in Appendix C.

The analytical results of the historic data from the monitoring wells from 1991 (three rounds) revealed inorganic constituents at lower concentrations during this RI than during the 1991 sampling. This was most evident with dissolved aluminum and dissolved iron. This trend also was evident to a lesser extent for calcium, magnesium, potassium, and sodium. In contrast to the general trend, inorganics in one well north of Site 1 were consistently higher in 1996 than in 1991. The inorganic concentrations in this well were the primary drivers for the high hazard index calculated for groundwater exposures.

Antimony concentrations detected in the groundwater sample upgradient of the landfill sites exceeded the site-related concentrations. Therefore, it does not appear that antimony is a landfill-related. constituent.

The primary quantified chemical exposure risk to human health from the landfill sites is from potential future residential and site worker contact with contaminated groundwater from the St. Mary's Formation. However, the exposure assumption that site groundwater might be used as a potable water source is highly conservative due to the hydraulic connection between the St. Mary's Formation and the surficial Lowland Deposits. The two formations together form the surficial aquifer and would experience brackish water intrusion downgradient of the landfills if pumped routinely, making water withdrawn from these deposits non-potable. Even though there were exceedances of the MCLs in groundwater downgradient from the landfill, the water downgradient from the landfill is Class III groundwater, therefore there is no potential risk. In addition, St. Mary's County prohibits installation of drinking water wells within the surficial aquifer (Class III aquifer) throughout the NAS.

Because there is no reasonable human exposure scenario for contaminated groundwater, the risks associated with groundwater at Sites 1 and 12 are considered to be negligible and are not addressed further in this ROD.

2.7.2 Summary of Ecological Risk Assessment

A screening-level ecological risk assessment (ERA) was conducted to characterize ecological risks at Sites 1 and 12 if no additional remediation is implemented.

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In conducting the screening-level ERA for Sites 1 and 12, Contaminants of Potential Concern (COPCs) were identified using benchmark screening levels developed by the EPA Region III Biological Technical Assistance Group (BTAG). The potential exposure of selected environmental receptors to each COPC was then calculated. Receptor species were chosen for assessment for one or more of the following reasons:

- 1. They are known to occur on the site;
- 2. Suitable habitat exists for their occurrence;
- 3. They serve as surrogate species with the potential to occur, and have been included because of the availability of life history information;
- 4. They provide representation for a variety of positions in the food chain; and
- 5. They complete an exposure pathway.

The life history information for each of the receptor species was researched. This information was used, along with the mean and maximum constituent concentrations for each media, to determine potential exposure dosages. These dosages were compared to chronic toxicity data for each of the species.

The screening-level ERA determined that there was a potential for adverse ecological effects resulting from the river surface water and sediment. However, the potential risk from metals and pesticides in surface water and sediment was not evaluated further because the metals and pesticides appear to be within the background range.

Slightly elevated metal concentrations were detected in soil east of Site 1 (Area F) during sampling. Review of the historical record for the landfills reveals that this area was used as a source of soil to cover the landfills. After the soil was removed, the area received an application of solid waste sludge from the St. Mary's County Metropolitan Commission (the municipal waste water treatment facility) to amend the soil with organic material so that vegetation could be re-established. The sludge application was permitted by the State of Maryland. Although some metals in soil from Area F slightly exceed the conservative screening levels used in ecological risk assessments, the soil was not evaluated further because it will be used as the base for the final vegetated soil cover on the landfills. By using the soil from this area as the base for the final vegetated cover, the pathway of exposure for ecological receptors is minimized. Therefore, no further action or study is required at Area F.

In addition, an ecological evaluation showed that no compounds were present above background levels for the concrete rubble disposal area northeast of Site 1 (Area A). A separate evaluation is currently under way to determine whether any release occurred from the surface debris within the 0.25 acres of the ravine at Area C, and if so, whether any soil in addition to the debris needs to be removed. The conclusions of this evaluation will be documented in the public record at a future date.

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2.7.3 Basis for Action

Based on the human health and ERAs, the response action selected in this ROD is necessary to protect the public health or welfare and the environment from exposure to the landfill debris, since in most cases, only a thin layer of soil cover separates the landfill from trespassers. Several areas contain exposed surface debris that could pose a physical hazard to recreational users, trespassers, and environmental receptors.

2.8 Remedial Action Objectives

During the FS, a detailed analysis of possible remedial alternatives was conducted for Sites 1 and 12. Each remedial alternative was developed to meet remedial action objectives (RAOs), which were based on an evaluation of site conditions, potential risks, and legal requirements for Sites 1 and 12. The following RAOs were identified:

- Protect human health and the environment;
- Comply with all applicable or relevant and appropriate federal and state environmental laws and regulations;
- Be cost effective;
- Use permanent solutions and alternative treatment technologies or resource-recovery technologies to the maximum extent practicable;
- Prevent or minimize direct contact of human and ecological receptors with landfill contents and surface soil within the landfill boundaries, and with surface debris in the adjacent areas;
- Prevent surface water run-on, control surface water runoff, and minimize erosion within the Site 1 and Site 12 landfill boundaries;
- Enhance ecological habitat through revegetation;
- Reduce further migration of contamination from the landfill to the groundwater and surface water.

In addition, each remedial alternative should maintain existing ecological habitat and develop recreational use to the extent possible, recognizing that the primary objective of this remedial action is to prevent human and ecological exposure to waste materials in the landfill.

2.9 Description of Alternatives

To meet RAOs listed above, remedial technologies were screened to develop remediation alternatives. Technologies were screened based on their suitability for specific site characteristics, including contaminant types, quantities, and concentrations; and physical site conditions. The following remedial technologies were included in the initial screening process: institutional controls with long-term monitoring, containment, in-situ and ex-situ

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treatment, removal, and disposal. A detailed description of the remedial technologies screening process is provided in the FS.

Using the remedial technologies retained following initial screening, five remedial action alternatives were developed to meet the RAOs. Remedial alternatives were developed to address Sites 1 and 12, including the landfills (Areas B and D); surface debris adjacent to the landfills (Area C) surface water and sediment contamination in the adjacent marsh area (Area E); and surface soil east of the landfills (Area F), which was amended in 1990 with the application of wastewater treatment plant sludge. Concrete rubble and reinforcing steel identified in Area A are classified as 'clean fill' under Maryland State Regulations. As a result, no action is proposed in Area A.

The following remedial alternatives were originally listed in the FS for OU-1 at Sites 1 and 12:

- Alternative 1 No Action
- Alternative 2 Institutional Controls and Long-term Monitoring; Installation of a Soil Cover Over Areas B and D; Excavation of Contaminated Material and Debris From Areas C and E, and Offsite Disposal
- Alternative 3 Institutional Controls and Long-term Monitoring; Installation of a Soil Cover Over Areas B, D and E; Excavation of Contaminated Material and Debris From Area C, and Offsite Disposal
- Alternative 4 Institutional Controls and Long-term Monitoring; Installation of a Resource Conservation and Recovery Act (RCRA) Subtitle D Cap Over Areas B and D; Excavation of Contaminated Material and Debris From Areas C and E, and Disposal in Areas B and D
- Alternative 5 -- Institutional Controls and Long Term Monitoring; Installation of a RCRA Subtitle D Cap Over Areas B, D and E; Excavation of Contaminated Material and Debris From Area C, and Disposal in Areas B and D

Following the completion of the FS, a decision was made among the Navy, EPA, and MDE to designate the marsh (Area E) as a separate OU (OU-2) from the remaining five areas at Sites 1 and 12. The decision was made because: 1) the marsh contains a different contaminated medium (sediment) than Areas A, B, C, D, and F; and 2) the marsh requires further study to quantify ecological risks and determine whether there is a need for remedial action. Because of the designation of the marsh as OU-2, remediation of the marsh is not considered in this ROD, but will be considered at a later date following the completion of an ecological study in the area.

In the FS, Alternatives 3 and 5 called for the placement of soil cover and a RCRA Subtitle D cap, respectively, over the marsh. However, since the marsh is no longer included in OU-1, Alternatives 3 and 5 are no longer being considered. For purposes of discussion in this ROD, Alternative 4, listed above, has been renamed "Alternative 3".

2.9.1 Description of Remedy Components

Major components of each remedial alternative are provided in the following subsections.

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2.9.1.1 Alternative 1 - No Action

Description: Under this alternative, no further effort or resources would be expended at Sites 1 and 12. Alternative 1 serves as the baseline against which the effectiveness of the other alternatives is judged.

Costs: There would be no costs associated with this alternative.

2.9.1.2 Alternative 2 - Soil Cover

Description: Alternative 2 includes the installation of a soil cover over the Fishing Point Landfill (Site 1) and the Rifle Range Landfill (Site 12), and excavation and offsite disposal of surface debris from Area C. The major components of Alternative 2 include the following:

- Installation of a soil cover over the Fishing Point Landfill (Site 1) and Rifle Range Landfill (Site 12). The soil cover will consist of a minimum of 6 inches of topsoil overlain by a minimum of 18 inches of clean vegetative support material.
- Excavation and offsite disposal of construction debris from a ravine adjacent to Rifle Range Landfill.
- Shoreline stabilization on the northwest portion of the landfills to prevent erosion of the Fishing Point Landfill, protect the soil cover, and maintain access to the western beach for limited recreational use. Stabilization and erosion control measures will preserve habitat along the shoreline to the extent possible, and will maintain access to the western beach for recreational use.
- One-for-one mitigation of approximately 3.6 acres of emergent wetlands, eliminated or disturbed as the result of installing the soil cover over Sites 1 and 12, either onsite or elsewhere on the NAS.
- Land use restrictions to prevent future disturbance of the landfill contents at Sites 1 and 12 beneath the soil cover.
- Five-year reviews at Sites 1 and 12. Long-term monitoring will be conducted to track future contaminant migration and monitor the effectiveness of the remedy, and data will be evaluated during the 5-year site reviews.
- An operation and maintenance (O&M) plan for Sites 1 and 12 will consist of monitoring and
 maintenance of the stormwater management system, vegetation cover, and erosion control
 structures. Groundwater monitoring will be conducted using the existing onsite monitoring wells or
 replacement monitoring wells.

In addition to the components of Alternative 2 specified in the FS, soil from Area F would be used as a base to establish grades necessary for the soil cover at the Sites 1 and 12 landfills, and landfill gas would be collected through a passive gas collection system and vented to the atmosphere.

Costs: The estimated costs for Alternative 2 are as follows:

• Capital \$ 3,720,000

• Annual operation and maintenance: \$ 56,564

• Net present worth (30 year, 5% discount rate): \$ 4,590,000

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The capital cost of the landfill gas collection system, which was not calculated for the FS, is estimated at \$66,500 (in addition to the above costs).

Estimated Implementation Time: The estimated implementation time for Alternative 2 is 12-18 months (not including O&M or wetland mitigation). The estimated time to construct functioning wetlands to mitigate those disturbed as part of capping activities is 15 to 18 months after the wetland design is completed.

2.9.1.3 Alternative 3 - RCRA Subtitle D Cap

Description: Alternative 3 includes the installation of a RCRA Subtitle D cap over Areas B (Site 1) and D (Site 12), and excavation of surface debris from Area C (debris would be disposed of into the landfills at Sites 1 and 12). The major components of Alternative 3 include the following:

- Excavation of the surface debris from Area C. The excavated material will be disposed of in the Sites 1 and 12 landfills. Additional soil required to establish grades prior to capping of Sites 1 and 12 will be obtained from Area F.
- Installation of a RCRA Subtitle D cap over Sites 1 and 12. The RCRA Subtitle D cap will consist of 6 inches of topsoil; 18 inches of vegetative support; a 12-inch gravel drainage layer; a geosynthetic membrane; and 6 inches of bedding soil. The cap will be designed with minimum 5 percent grade and maximum 3:1 grades to promote drainage and ensure stability in accordance with RCRA design guidelines. A vegetative cover will be established over the capped area. A passive landfill gas system win be installed to vent landfill gases.
- Shoreline stabilization on the northwestern portion of the landfills to prevent erosion of the Fishing Point Landfill, protect the soil cover, and maintain access to the western beach for recreational use. Stabilization measures will preserve habitat along the shoreline to the extent possible, and will maintain access to the western beach for recreational use.
- Emergent wetlands eliminated as a result of the installation of the cap on the Site 1 landfill (approximately 2.6 acres), along with the portion of the marsh impacted by installation of the cap (approximately 1 acre), will be mitigated (one-for-one) elsewhere on the NAS.
- Land use restrictions will be incorporated into the Navy's planning documents to prevent future disturbance of the landfill contents at Sites 1 and 12 beneath the RCRA cap (i.e., restrictions on hunting, drilling, and digging). Provisions will be made to allow pedestrian access to the site for recreational purposes, but warning signs and other methods will be used to prohibit vehicle access and other activities that may potentially damage the cap.
- Five-year site reviews will be required at Sites 1 and 12, since contamination would remain in place at these areas under this alternative. Long-term monitoring will be conducted to track future contaminant migration and to monitor the effectiveness of the remedy, and data will be evaluated during the 5-year site reviews.

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An O&M plan will be implemented at Sites 1 and 12. O&M will consist primarily of maintaining the
gas extraction system, stormwater management system, and vegetation, and preventing erosion.
Groundwater monitoring will be conducted using the existing monitoring wells onsite. Perimeter
monitoring of landfill gas will be implemented to monitor potential horizontal migration. Further
evaluation of the landfill gas data will be done during the design to verify the necessity of perimeter
monitoring.

In addition to the components of Alternative 3 specified in the FS, soil from Area F would be used as a base to establish grades necessary for the soil cover at the Sites 1 and 12 landfills.

Costs: The estimated costs for Alternative 3 are as follows:

• Capital \$ 7,420,000

• Annual operation and maintenance: \$ 66,564

• Net present worth (30 year, 5% discount rate): \$ 8,440,000

Estimated Implementation Time: The estimated implementation time for Alternative 3 is 24 months (not including O&M or wetland mitigation). The estimated time to construct functioning wetlands to mitigate those disturbed as part of capping activities is 15 to 18 months following completion of the design.

2.9.2 Common Elements and Distinguishing Features of Each Alternative

Alternatives 2 and 3 share a common remediation approach for Sites 1 and 12. Key applicable or relevant and appropriate requirements (ARARs) are the same for each alternative, and these ARARs are summarized in Appendix D. The quantity of untreated waste that would remain onsite is identical under Alternatives 2 and 3, except for waste in Area C that would be transported off site under Alternative 2. The following elements are common to both alternatives:

- 1. Containment of wastes in Sites 1 and 12;
- 2. Excavation and disposal of contaminated material from the ravine at Area C;
- 3. Implementation of stabilization measures along a portion of the western shoreline of Fishing Point;
- 4. Mitigation of wetlands that are eliminated during the construction of the soil cap or cover material;
- 5. Implementation of institutional controls to prevent disturbance of the cap or soil cover; and
- 6. Completion of 5-year site reviews and long-term monitoring.

The primary feature that distinguishes Alternative 2 from Alternative 3 is the material that is placed over waste in Sites 1 and 12. Alternative 2 calls for a soil cover, consisting of a minimum of 24 inches of subsoil and topsoil. Alternative 3 provides for a RCRA Subtitle D cap, which consists of topsoil, subsoil for vegetative support, drainage layer, geosynthetic

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membrane, and bedding soil. The costs and project duration associated with Alternatives 2 and 3 reflect the differences in cover design implemented under each alternative.

2.9.3 Expected Outcomes of Each Alternative

Under both Alternatives 2 and 3, provisions will be made to allow pedestrian access to Sites 1 and 12 for recreational use. The amount of time that access to the western shoreline would be blocked due to construction would be approximately 12 to 18 months (approximately 6 months longer for Alternative 3), between installation of the cover and revegetation of the area. Land use restrictions will be implemented to prevent disturbance of the soil cover or RCRA Subtitle D cap overlying waste in Sites 1 and 12.

Groundwater within the surficial aquifer beneath Sites1 and 12 will not be used for drinking water purposes. St. Mary's County already prohibits the installation of drinking water wells within the aquifer.

2.10 Summary of Comparative Analysis of Alternatives

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) outlines the approach for comparing remedial alternatives. Evaluation of the alternatives uses "threshold" criteria, "primary balancing" criteria, and "modifying" criteria. All alternatives are evaluated against the threshold and primary balancing criteria, which are technical criteria based on human health and environmental protection, cost, and engineering feasibility.

To be considered for remedy selection, an alternative must meet the two threshold criteria:

- 1. Overall protection of human health and the environment
- 2. Compliance with ARARs

The primary balancing criteria then are considered to determine which alternative provides the best combination of attributes. The primary balancing criteria are:

- 1. Long-Term Effectiveness and Permanence
- 2. Reduction in Toxicity, Mobility, or Volume through Treatment
- 3. Implementability
- 4. Short-Term Effectiveness
- 5. Cost

The preferred alternative is evaluated further against two modifying criteria:

- 1. State acceptance
- 2. Community acceptance

Each of the alternatives presented in Section 2.9 were compared using the threshold, primary balancing, and modifying criteria. The summary analysis and evaluation of each remedial alternative is provided below. The FS provides a more detailed analysis and evaluation

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2.10.1 Threshold Criteria

2.10.1.1 Overall Protection of Human Health and the Environment

The soil cover and cap designs required by Alternatives 2 and 3, respectively, would prevent direct contact of human and ecological receptors with landfill contents. Both of these alternatives would be constructed to minimize surface water run-on, control surface water runoff, and reduce erosion from the Site 1 and 12 landfills. Alternative 3 would be the most protective because the RCRA Subtitle D cap would reduce surface water infiltration through the landfill to the greatest extent of the alternatives under consideration. Alternative 1 would not protect human health and the environment and is, therefore, no longer considered in this analysis.

2.10.1.2 Compliance with ARARs

Alternative 3 complies with ARARs. Under Alternative 2, the construction of a 2-foot soil cover (instead of a RCRA Subtitle D cap) requires a variance from the State of Maryland's final cover design specifications for landfill closure (Code of Maryland Regulations [COMAR] 26.04.07.21 and COMAR 26.04.07.22). The variance (COMAR 26.04.07.26) was requested because a soil cover would prevent contact of human and ecological receptors with landfill debris as effectively as a RCRA Subtitle D cap, and because there are no current or reasonable future exposure pathways to shallow groundwater immediately downgradient of the landfill for human or environmental receptors. Even though there were exceedances of the MCLs in groundwater downgradient from the landfill, the surficial groundwater downgradient from the landfill would be Class III groundwater if drinking-water extraction wells were installed, therefore MCLs are not applicable. In addition, a RCRA Subtitle D cap would not prevent groundwater from being in direct contact with landfill waste, because the water table is primarily controlled by the water level of the Patuxent River and not by the amount of surface water infiltration. As a result, a RCRA Subtitle D cap would not reduce risks to human health or the environment to a significantly greater extent than a soil cover. Groundwater would continue to be monitored under Alternative 2 to ensure that contaminant levels do not increase significantly over current concentrations. The State of Maryland has granted the requested variance.

Alternatives 2 and 3 both meet ARARs pertaining to the protection of wetlands, including Section 404 of the Clean Water Act; 40 Code of Federal Regulations (CFR) Part 6; COMAR 26.23; COMAR 26.24, and Annotated Code of Maryland, Environment Article, Title 16. A complete list of the ARARs, including the prerequisites for applicability and an explanation of the specific remedy component affected, is set forth in Appendix D.

2.10.2 Primary Balancing Criteria

2.10.2.1 Long Term Effectiveness and Permanence

Alternatives 2 and 3 would be effective in the long term. Alternative 3 may be slightly more effective in the long term than Alternative 2 because of the increased protection from surface water infiltration that Alternative 3 would provide to groundwater beneath the Sites 1 and 12 landfills. However, the reduction of surface water infiltration may not improve long-term groundwater quality significantly, since groundwater already comes in contact with the landfilled wastes. In addition, there is no significant exposure pathway to

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groundwater, Both Alternatives 2 and 3 would reduce the risk associated with debris in the ravine (Area C) because contaminated materials in this area would be excavated. Land use restrictions and long-term monitoring would reduce residual risk by preventing future disturbances of capped media and by monitoring for contaminant migration, respectively. A RCRA Subtitle D cap or vegetated soil cover over Sites 1 and 12, however, would not remove contaminated material from these areas. The long-term effectiveness and permanence of Alternatives 2 and 3 would depend on the long-term maintenance of the cap or soil cover.

2.10.2.2 Reduction in Toxicity, Mobility, or Volume through Treatment

Alternatives 2 and 3 would not use treatment to reduce the toxicity, mobility, or volume of the landfill materials, due to the heterogeneity of the landfill contents. Although Alternative 3 (RCRA cap) would provide more protection from infiltration than Alternative 2 (soil cover), groundwater quality under Alternatives 2 and 3 would not differ greatly because landfill waste already extends below the water table.

2.10.2.3 Implementability

Alternative 2 would be easier to implement than Alternative 3. Under Alternative 3, a specialty contractor would be required to install a RCRA Subtitle D cap. Such a contractor would not be required to construct the vegetated soil cover described in Alternative 2. Land use restrictions and 5-year site reviews would be required for all alternatives because contaminated material would remain onsite following remedial action.

2.10.2.4 Short-Term Effectiveness

Alternatives 2 and 3 would potentially expose workers to contaminated material and debris. Under both alternatives, a significant amount of construction activity, including excavation, handling of construction debris, surface debris, and soil will be required, so the potential for fugitive dust and impacts from air emissions would exist. Exposure risk will be minimized by wearing personal protective equipment (PPE) and by implementing dust and emission controls. Implementation of these alternatives would result in minimal increased risk to the surrounding community and ecosystems over current conditions because landfill contents will remain in place.

2.10.2.5 Cost

The estimated present-worth costs of Alternatives 2 and 3 are as follows:

Alternative 2: \$4,650,000

Alternative 3: \$8,580,000

2.10.3 Modifying Criteria

2,10.3.1 State of Maryland Acceptance

The MDE has reviewed the Proposed Remedial Action Plan and has concurred with the preferred remedial action, Alternative 2. Appendix A contains the state letter of concurrence along with state approval of the request for a variance from state solid waste regulations.

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2.10.3.2 Community Acceptance

The preferred alternative and other alternative's considered in the FS were presented to the public on November 1, 1999. Comments obtained during the public meeting, held on November 9, 1999, and the 30-day comment period are presented in the Responsiveness Summary (Section 3.0). No community members expressed dissatisfaction with the preferred alternative.

2.11 Principal Threat Waste

Principal threat wastes are source materials that are considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur (A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Documents; EPA, 1999). Based on this definition and the results of the human health and ecological risk assessments, principal threat wastes are not present within OU-1. The following evidence supports this statement:

- 1. The human health risk assessment found no carcinogenic risks associated with wastes at Sites 1 and 12 above EPA's acceptable range. Non-cancer risks identified for groundwater in the area are considered to be negligible because there is no reasonable human exposure scenario for contaminated groundwater.
- 2. The screening-level ERA found no ecological risks within OU-1. Potential risks associated with surface water and sediment in Area E will be addressed as OU-2 and are not addressed by this ROD.
- 3. Source materials in Sites 1 and 12 can be contained in a reliable manner. Containment is a common remedial approach for landfills such as those present at Sites 1 and 12.

2.12 Selected Remedy

The selected remedy for Sites 1 and 12 is Alternative 2: Institutional Controls and Longterm Monitoring; Installation of a Soil Cover over Areas B and D; Excavation of Contaminated Material and Debris from Area C, and Offsite Disposal. A schematic of the selected remedy is displayed in Figure 2-6.

2.12.1 Summary of the Rationale for the Selected Remedy

Alternative 2 was selected as the remedy for Sites 1 and 12 because it offers the best balance of the nine NCP criteria, based on available information and a current understanding of site conditions. Alternative 2 is protective of human health and the environment because it prevents exposure to landfill wastes through the construction of a soil cover over Sites 1 and 12. The selected alternative is readily implementable and cost-effective. The construction of a soil cover, instead of a more elaborate RCRA Subtitle D cap, reduces construction and O&M costs while maintaining a similar level of effectiveness. The selected alternative considers the public's desire for restoring limited recreational use of Sites 1 and 12. Stabilization measures along the northwestern portion of Site 1 will allow for public access while maintaining habitat in the area.

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2.12.2 Description of the Selected Remedy

Under Alternative 2, a soil cover with minimum 2 percent and maximum 3 horizontal: 1 vertical side grades will be placed over the landfill areas of Sites 1 and 12. The soil cover will consist of a minimum of 18 inches of subsoil and minimum 6 inches of topsoil capable of supporting vegetative growth. The base for the soil cover will be obtained from the area east of Site 1 (Area F). Approximately 2.6 acres of wetlands will be eliminated in Site 1 as a result of installing the soil cover. In addition, approximately 1 acre of the marsh west of Site 12 will be disturbed during the installation of the soil cover. These emergent wetlands will be mitigated, one-for-one, elsewhere on the NAS. Surface debris and contaminated soil will be excavated from a ravine (Area C) and disposed in an offsite permitted landfill. Shoreline stabilization will be implemented along the northwestern portion of Site 1, in order to stabilize current erosion.

Institutional controls will consist of the following: (1) access restrictions to prevent trespassing and disturbance to the soil cover, and (2) deed notices and land use controls to limit site development and access to groundwater. Monitoring will be performed to assess the migration of contaminants into the environment and to evaluate the effectiveness of the remedy. Routine operation and maintenance activities will be performed to promote long-term stability of the soil cover. A review will be conducted every 5 years to evaluate whether human health and the environment continue to be protected.

2.12.3 Summary of the Estimated Remedy Costs

A detailed breakdown of costs associated with Alternative 2 is presented in Appendix E. The information provided in the cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment. The cost estimate provided in Appendix E is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. The cost estimate is based on a 5 percent discount rate and 30-year duration.

2.12.4 Expected Outcomes of the Selected Remedy

Alternative 2 will allow for pedestrian access to Sites 1 and 12 for limited recreational use. Stabilization measures along the northern portion of the western shoreline of Site 1 will preserve habitat along the shoreline to the extent possible, while maintaining access to the western shore for limited recreational use. The amount of time that access to the shoreline will be blocked due to construction will be approximately 12-18 months. Land use restrictions will be implemented to prevent disturbance of the soil cover material overlying waste in Areas B and D.

Groundwater within the surficial aquifer beneath Sites 1 and 12 will not be used for drinking water purposes. St. Mary's County prohibits the installation of drinking water wells within the surficial aquifer.

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2.12.5 Performance Standards of the Selected Remedy

Performance standards for the selected remedy, described above, fall under six general categories:

- 1. Institutional Controls
- 2. Soil and Debris Removal and Disposal
- 3. Vegetated Soil Cover
- 4. Shoreline Stabilization
- 5. Site Monitoring
- 6. Wetland Mitigation

Performance standards related to each of these categories are discussed below.

2.12.5.1 Institutional Controls

Under the selected remedy, institutional controls at Sites 1 and 12 shall be implemented to limit future site land use. The selected remedy is not designed to protect human health if Sites 1 and 12 are used for residential purposes. Accordingly, unless the remedy selected in this ROD is revisited and all necessary steps, including additional response actions, are taken to protect human health and the environment, NAS Patuxent River shall prohibit, except as provided below:

- Future excavation and any other activity that would disturb the integrity of the soil cover overlying the Sites 1 and 12 landfills:
- Access to groundwater underlying Sites 1 and 12; and
- Residential use of Sites 1 and 12.

Land Use Control Implementation Plan: NAS Patuxent River shall develop, in consultation with EPA and MDE, a Land Use Control Implementation Plan (LUCIP). The LUCIP shall include a description of Sites 1 and 12, including a map, a description of its size, and a description of the contaminants of concern; the land use controls selected above; the particular mechanisms to implement these controls; a reference to this ROD; and any other pertinent information.

Assuring Continued Effectiveness of Land Use Control: The Navy, MDE, and EPA intend to negotiate a Land Use Control Assurance Plan (LUCAP) in the near future, which will establish procedures for ensuring that the land use controls for Sites 1 and 12 and all other IR sites at Patuxent River Naval Air Station remain effective and protective in the long-term. In the meantime, NAS Patuxent River shall implement the procedures outlined below to ensure the continued effectiveness of the land use controls for Sites 1 and 12.

NAS Patuxent River shall conduct an annual visual inspection of Sites 1 and 12 to verify that the land use controls for these sites have been implemented and are being properly maintained. NAS Patuxent River shall promptly notify EPA and MDE of any deficiencies noted, any corrective measures taken or to be taken, and the schedule for taking such corrective measures.

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In addition to a visual inspection, NAS Patuxent River shall annually review the status of the land use controls for these sites. Any non-compliance issues will be appropriately resolved with EPA and MDE.

The U.S. Navy shall annually prepare and forward to EPA and MDE a report, signed by the Commanding Officer, certifying the continued retention of the land use controls for Sites 1 and 12.

The above requirements for inspecting, reviewing, and certifying the continued effectiveness of land use controls at Sites 1 and 12 are intended to be in addition to, and not a replacement for, requirements in the Operation and

Maintenance (O&M) Plan for the remedy selected in this ROD. An O&M Plan will be developed for this remedy.

At least 60 days (except in emergency situations) prior to implementation of any major change in land use at Sites 1 and 12, NAS Patuxent River shall notify EPA and MDE of the contemplated change. The notification shall be provided to obtain EPA's concurrence and MDE's support of the NAS Patuxent River's determination as to whether the contemplated change will or will not necessitate the need for re-evaluation of the selected remedy or implementation of specific measures to ensure continued protection of human health and the environment.

NAS Patuxent River also agrees to immediately notify EPA and MDE if, despite its best efforts to ensure compliance with the land use controls for Sites 1 and 12, any major change in land use at Site 1 and 12 is discovered which has not been previously reviewed by EPA and MDE. Such notifications will provide all pertinent information as to the nature and extent of the change and describe any measures implemented or to be implemented, including a timetable for future completion, to reduce or prevent human health or ecological impacts.

2.12.5.2 Soil and Debris Removal and Disposal

The selected remedy calls for the removal of soil and debris from Area C, a ravine adjacent to Site 12. Debris will be removed from Area C and disposed in an offsite RCRA Subtitle D (non-hazardous waste) permitted landfill. If found necessary, based on sampling and analysis results, soil will also be removed from Area C to the extent required to protect human health and the environment.

2.12.5.3 Vegetated Soil Cove

The selected remedy calls for a compacted soil cover to be constructed over the Fishing Point and Rifle Range Landfills (Areas B and D). The soil cover will consist of a minimum of 6 inches of topsoil and minimum 18 inches of vegetative support soil. The cover shall be graded with grades of at least 2 percent and no more than 3:1, and surface water controls shall be implemented to manage stormwater runoff. Landfill contents extending beyond the limits of the soil cover (i.e., the northwest corner of Area B) will be excavated and placed beneath the soil cover. Landfill gas will be collected in a passive gas collection system and vented to the atmosphere.

An O&M Plan will be prepared and reviewed by EPA and MDE. The O&M Plan will outline the frequency and scope of the inspections, erosion and sedimentation control

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measures, stormwater management procedures, maintenance, reporting requirements, sampling frequency, contingency measures, and other pertinent aspects.

2.12.5.4 Shoreline Stabilization

Stabilization measures will be implemented along a portion of the western shoreline of Fishing Point to minimize erosion of the Fishing Point Landfill, protect the soil cover, preserve habitat along the shoreline to the extent possible, and maintain access to the western beach for recreational use. The design of the shoreline stabilization will be integrated into the vegetated soil cover design to prevent damage to the soil cover in the event of a severe storm.

2.12.5.5 Site Monitoring

Groundwater monitoring will be conducted. Routine inspections of the soil cover and vegetation shall be conducted to identify and repair erosion-related damage to the cover.

2.12.5.6 Wetland Mitigation

Wetlands impacted as a result of soil cover construction will be mitigated as part of this remedial action. The design for wetland mitigation will be prepared as an addendum to the design for the landfill cover.

2.13 Statutory Determinations

Remedial actions must meet the following statutory requirements of CERCLA Section 121:

- 1. Protection of human health and the environment
- 2. Compliance with ARARs (or justification of a waiver)
- 3. Cost effectiveness
- 4. Utilization of permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable
- 5. Preference for treatment that reduces toxicity, mobility, or volume as a principal element, or explanation as to why this preference is not satisfied

A discussion of how the selected remedy satisfies each of these statutory requirements is provided in the following subsections.

2.13.1 Protection of Human Health and the Environment

The selected remedy will protect human health and the environment. A vegetated soil cover over Sites 1 and 12 will minimize direct contact of human and ecological receptors with contaminated landfill contents, and the soil cover would reduce transport of contamination from the landfill contents to groundwater. Short-term risks associated with exposure to contaminated soil during excavation, transportation, and disposal will be minimized through safe work practices and the use of PPE.

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2.13.2 Compliance with ARARs

Chemical-specific ARARs

No chemical-specific ARARs were identified for Sites 1 and 12, OU-1, since the only potential risks identified in the human health and ecological risk assessments were identified in groundwater, which does not have a reasonable exposure pathway to potential receptors.

Location-specific ARARs

The selected remedy complies with each of the location-specific ARARs listed in Appendix D.

Action-specific ARARs

Under the selected remedy, the construction of a vegetated soil cover requires a variance from one action-specific ARAR: the State of Maryland's final cover design specifications for landfill closure (COMAR 26.04.07.21 and COMAR 26.04.07.22). The variance (COMAR 26.04.07.26) is justified because a soil cover would prevent contact of human and ecological receptors with landfill debris as effectively as a RCRA Subtitle D cap, and because there are no current or reasonable future exposure pathways to shallow groundwater for human or ecological receptors. MDE has granted the requested variance.

The selected remedy also will meet ARARs pertaining to the protection of wetlands, including Section 404 of the Clean Water Act; 40 CFR Part 6; COMAR 26.23; COMAR 26.24; and Annotated Code of Maryland, Environment Article, Title 16.

2.13.3 Cost Effectiveness

The selected remedy addresses contamination at Sites 1 and 12 in a cost-effective manner. Although a RCRA Subtitle D cap, included in Alternative 3, would reduce surface water infiltration more effectively than a soil cover under the selected remedy, the RCRA cap is unlikely to greatly improve overall groundwater quality because some of the waste in the landfill lies below the water table. A potential reduction in groundwater contamination does not appear to justify the substantial additional cost of a RCRA cap, because there is no viable human exposure pathway for groundwater, and groundwater contamination does not pose a risk to ecological receptors.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Possible

The selected remedy will be effective in the long term. The long-term effectiveness of the vegetated soil cover over Sites 1 and 12 will depend in large part on maintenance of the soil cover.

Due to cost constraints, alternative treatment and resource recovery technologies are not included in the selected remedy.

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2.13.5 Preference for Treatment as a Principal Element

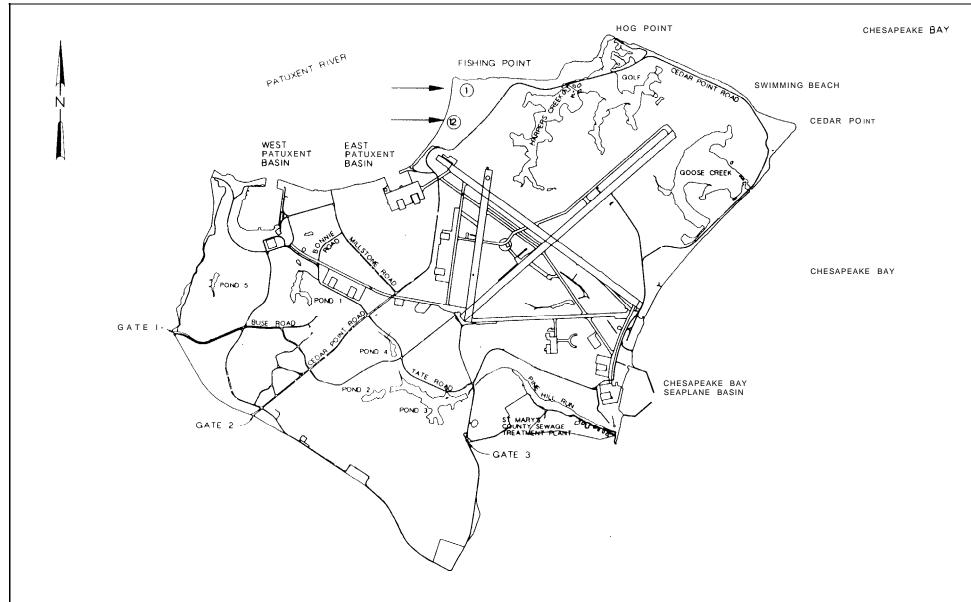
The selected remedy does not employ treatment to reduce the toxicity, mobility, or volume of contaminated materials at Sites 1 and 12. Treatment at these sites would be costprohibitive due to the widespread extent of contamination throughout the landfills. In addition, treatment of contaminated materials in Area C was not included in the selected remedy because of the cost savings realized by excavating and disposing of these materials in an offsite landfill.

2.14 Documentation of Significant Changes

One significant change was made to the selected remedy, Alternative 2, since the completion of the FS report. Because the marsh west of Site 12 was separated out of OU-1 after the FS was completed, remedial actions for the marsh are no longer included in the selected remedy. The marsh will be addressed at a later date, following the completion of additional ecological study in the area.

The only change made to the alternative recommended in the PRAP was the addition of a passive landfill gas collection system, rather than allowing landfill gases to dissipate through the soil cover. This system was added in order to ensure that landfill gases do not collect beneath low-permeability areas of the soil cover, potentially resulting in damage to the soil cover or subsurface migration of landfill gases away from the landfills. A passive gas collection system was selected because the Fishing Point and Rifle Range landfills are not expected to produce large quantities of gases. An active gas collection system, generally used for larger quantities of gas production, would require installation of a flare, which would be expensive to install and expensive to maintain. The passive system will minimize operations and maintenance requirements and have a lower risk of mechanical failure.

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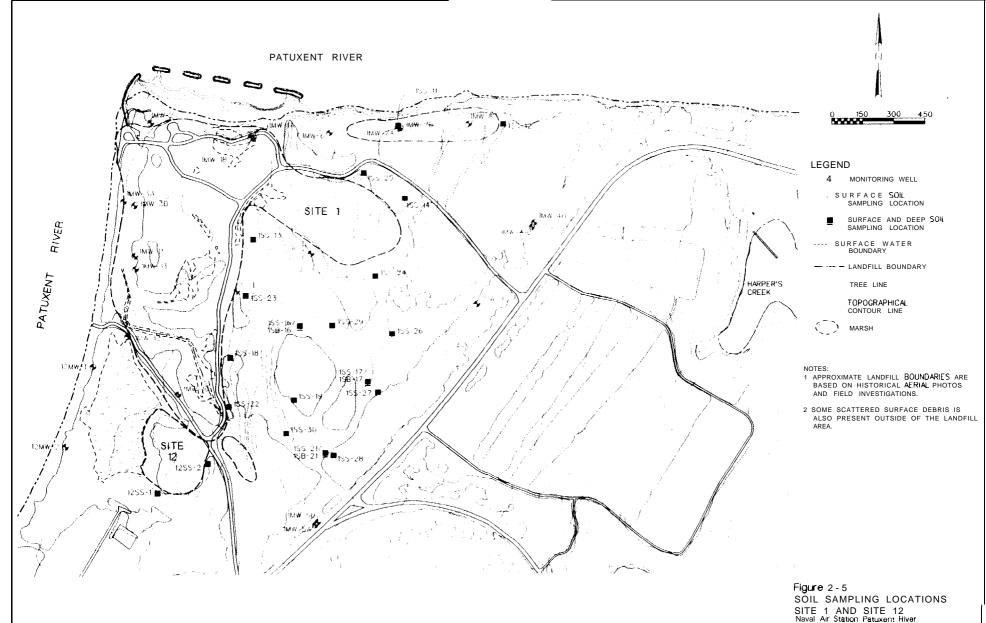


LEGEND

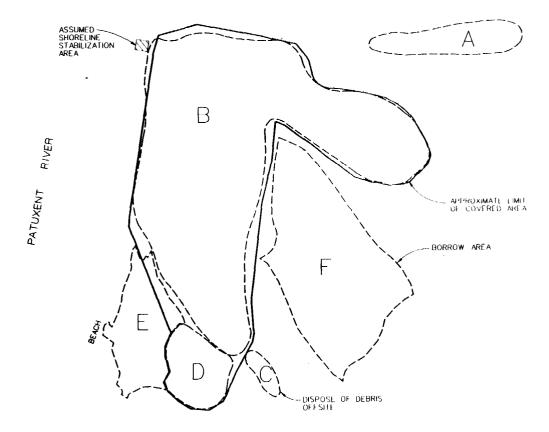
- (1) SITE I FISHING POINT, ANDFILL
- (2) SITE 12 RIFL, RANGE, ANDHILL

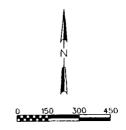
Figure 2-2
LOCATION OF SITES 1 AND 12
Naval Air Station Patuxent River

CH2MHILL



PATUXENT RIVER





LEGEND

PROPOSED LIMITS OF LANDFILL SOIL COVER

--- AREA BOUNDARY

MARSH/WETLANDS

ASSUMED AREA OF SHORELINE STABILIZATION

NOTES:

- 1, APPROXIMATE LANDFILL BOUNDARIES ARE BASED ON HISTORIC& AERIAL PHOTOS AND FIELD INVESTIGATIONS
- 2 SOME SCATTERED SURFACE DEBRIS IS ALSO PRESENT OUTSIDE -OF THE LANDFILL ARE A.
- 3. SOIL WILL BE EXCAVATED FROM AREA F TO BE USED AS GENERAL FILL BENEATH THE SOIL COVER IN AREAS B & D

Figure 2-6 DÉTAIL OF PREFERRED ALTERNATIVES FOR SITE 1 AND SITE 12 Na v a I Air Station Patuxent River

3.0 Responsiveness Summary

As described in Section 2.10, remedial alternatives for OU-1 were evaluated against seven of the nine evaluation criteria identified in the NCP at 40 CFR Section 300.430(e)(9). The last two of the nine evaluation criteria in the NCP are State Acceptance and Community Acceptance. The Responsiveness Summary is a concise and complete summary of state and community acceptance. The Responsiveness Summary provides the lead agency (U.S. Navy) with information on the views of the community. It also documents how the lead agency has considered public comments during the decision-making process and provides answers to major comments. This Responsiveness Summary was prepared after the public comment period, which ended on November 30, 1999, in accordance with the guidance document, *Community Relations in Superfund: A Handbook* (Office of Solid Waste and Emergency Response [OSWER] Directive 9230.0-3B, January 1992).

3.1 Stakeholder Issues and Lead Agency Responses

A public meeting was held on November 9, 1999 at the Frank Knox Training Center, located at NAS Patuxent River. The proposed remedial action plan for Sites 1 and 12 was presented at the public meeting. A transcript of the public meeting is provided in Appendix B.

No community members expressed dissatisfaction with the Navy's preferred alternative, Alternative 2. A few questions were raised during the meeting, and most were answered thoroughly during the meeting as documented in Appendix B. The community concerns have been studied, and responses are provided below.

1. Is contaminated groundwater discharging into the Patuxent River?

Navy Response: Shallow groundwater beneath and downgradient of the landfills has been contaminated by leachate from the landfills. This groundwater is discharging into the Patuxent River. Levels of contamination in groundwater are very low (in the parts per billion range), and are significantly diluted by the large volume of flow in the Patuxent River. Samples of surface water from the Patuxent River also were collected. Analytical results from surface water sampling, provided in Chapter 4 of the Remedial Investigation Report for Site 1 and Site 12, showed that there were no unacceptable levels of contamination in the Patuxent River.

2. How can you be sure that groundwater is flowing toward the Patuxent River and not toward shallow drinking water wells maintained by the Amish?

Navy Response: Water levels have been monitored on numerous occasions in the network of monitoring wells at the sites. These water levels show that groundwater flow in the shallow aquifer in this area is consistently toward the river.

3. Is the landfill trash submerged in water? If so, how deep?

Navy Response: Landfill trash is submerged in water. The thickness of trash below the water table varies depending on the time of year and amount of rainfall that has been

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received, as these factors affect the water level. During the Remedial Investigation, at least 12 inches of trash were observed below the water table at most locations, but the precise thickness of trash could not be determined during the test pit excavation because test pit walls were unstable below the water table.

4. Why has the location for wetlands mitigation not yet been identified?

Navy Response: Identification of the ideal location for wetlands mitigation is currently on hold. Our hope is that we can complete the ecological study at Area E (OU-2) quickly, so that any mitigation requirements from the remedy at OU-2 can be combined with mitigation of the wetlands on top of the landfills. This will allow construction of a larger wetland, if appropriate, rather than two smaller wetlands. Combining the mitigation efforts in this way is more likely to result in successful establishment of a functioning wetland.

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Glossary

Administrative Record — A body of documents that form the basis for the selection of a CERCLA response action and which are made available to the public to provide the public with the opportunity to participate and comment on the selection process.

Aquifer — A body of rock or soil that is sufficiently permeable to conduct groundwater and to yield economically significant quantities of water to wells and springs.

ARARS — Applicable or Relevant and Appropriate Standards, Limitations, Criteria, and Requirements— These are federal or state environmental rules and regulations.

Brackish Water — Water with a salinity intermediate between that of normal seawater and that of normal freshwater.

CERCLA — Comprehensive Environmental Response, Compensation, and Liability Act (1980) — Also known as the Superfund Law, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), CERCLA provides the organizational structure and procedures for responding to releases of hazardous substances, pollutants, and contaminants from inactive hazardous waste disposal sites.

Class III Groundwater — Groundwater that is classified as "Class III" has a total dissolved solids content of greater than 10,000 parts per million (ppm), rendering it nonpotable.

COPC — Contaminant of Potential Concern — Chemical compounds identified early in the risk assessment process that may pose a risk to human health and the environment at detected concentrations.

Downgradient — Toward the bottom of a slope, or in the direction of groundwater flow.

Ecological Receptors — Living organisms (other than humans and domesticated animals) that could be affected by a contamination in the environment.

Ecological Risk Screening — The qualitative evaluation to assess the risk posed to ecological receptors by the presence, potential presence, and/or use of specific COPCs.

EPA — United States Environmental Protection Agency.

Exposure Pathway — A way that a person, plant, or animal may be exposed to a COPC. For example, drinking contaminated water may be an exposure pathway for an animal.

FS — Feasibility Study — Analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site such as one on the National Priorities List. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is under way. Together they are commonly referred to as the "RI/FS."

Groundwater — Water that is found below the ground surface.

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HI — Hazard Index — A number indicative of noncarcinogenic health effects, which is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal or less than one indicates that the human population is not likely to experience adverse effects.

HQ — Hazard Quotient — The ratio of a single substance exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period.

Human Health Risk Assessment — The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health by the presence or potential presence and/or use of a specific COPC.

Human Nutrient — For the human health risk assessment, human nutrients are identified as calcium, magnesium, potassium, and sodium.

Hydraulic Conductivity — Property of soil or rock characterizing the rate at which water can flow through the material.

Installation Restoration (IR) Program — A component of the Defense Environmental Restoration Program created under CERCLA regulations and funded by the Department of Defense. The purpose of the program is to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at military activities.

Institutional Controls — Administrative methods to prevent human exposure to contaminants, such as by restricting land development.

IRI — Interim Remedial Investigation — Similar to a Remedial Investigation, but carried out prior to listing on the NPL. An in-depth study designed to gather data needed to determine the nature and extent of contamination at a site, establish site cleanup criteria, identify preliminary alternatives for remedial action, and support technical and cost analyses of alternatives.

MCLs — Maximum Contaminant Levels — The enforceable primary drinking water standards under the Safe Drinking Water Act (SDWA) with which public water systems must comply.

MDE — Maryland Department of the Environment.

Media — Soil, groundwater, surface water, sediment, or ambient air, at a site.

Monitoring Well — 1) A well used to obtain water quality samples or measure groundwater levels. 2) A well drilled at a hazardous waste management facility or Superfund site to collect groundwater samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site.

NCP — National Oil and Hazardous Substances Pollution Contingency Plan-Provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

NPL — National Priorities List — Nationwide list (developed by EPA) that identifies sites covered under CERCLA regulations for priority investigation and remedial action.

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OU — Operable Unit — Term for each of a number of separate activities undertaken as part of a Superfund site cleanup. For example, cleanup of soil and groundwater could be two separate operable units.

Performance Standards — Criteria that must be met by the selected remedial alternative in order to ensure that the action meets all remedial action objectives, including protection of human health and the environment.

Present-Worth Cost — Total cost, in current dollars, of the remedial action. The present-worth cost includes capital costs required to implement the remedial action, as well as the cost of long-term operations, maintenance, and monitoring.

Public Comment Period — The time allowed for the members of an affected community to express views and concerns regarding an action proposed to be taken by the government, such as a rulemaking, permit, or Superfund remedy selection.

RA — Remedial Action — The phase that involves the construction, operation, and implementation of the remedy to clean up the site.

RAB — Restoration Advisory Board— An advisory board, consisting of community members, designed to act as a focal point for the exchange of information between the NAS and the local community regarding environmental restoration activities.

RAOs — Remedial Action Objectives — The objectives of remedial actions developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health- and ecological-risk assessment, and attainment of regulatory cleanup levels, if any exist.

RCRA — Resource Conservation and Recovery Act — A 1976 regulation of the management of hazardous waste to ensure the safe disposal of wastes. The intent of the RCRA program is to protect public health and the environment by controlling hazardous waste.

Reference Dose — An estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime.

Removal Action — 1) An action to abate, minimize, stabilize, remove, or eliminate the release or threat of release of a hazardous substance, pollutant, or contaminant. 2) The cleanup or removal of hazardous substances, pollutants, and/or contaminants from the environment.

RI — Remedial Investigation — The RI is prepared to report the type, extent, and potential for transport of contaminants of potential concern at a hazardous waste site.

ROD — Record of Decision — A ROD is a public document which explains the cleanup alternative to be used at a CERCLA site. The ROD is based on technical and financial analyses generated during the RI/FS and on consideration of the public comments and community concerns.

Sediment — Solid material transported by water that is deposited in layers along channels of flow.

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Slope Factor — A plausible upper-bound estimate of the probability of a human physiological response per unit intake of a chemical over a lifetime. The slope factor is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular level of a potential carcinogen.

Surface Water — Water that occurs on the ground surface, usually in the form of a lake, stream, river, or other body of water.

SVOC — Semivolatile Organic Compound — One of a group of organic compounds composed primarily of carbon and hydrogen that are characterized by their low volatility. SVOCs include substances that are contained in hydrocarbon products like asphalt, oil, and tar.

TAL — Target Analyte List — A list of inorganic compounds (metals and cyanide) which EPA has identified for use in assessing potential hazards at CERCLA sites.

TCL — Target Compound List — A list of organic compounds including VOCs, SVOCs, pesticides, and PCBs which EPA has identified for use in assessing potential hazards at CERCLA sites.

VOC — Volatile Organic Compounds — A group of organic compounds composed primarily of carbon and hydrogen that are characterized by their tendency to readily evaporate (or volatize) into the air from water or soil. VOCs include substances that are contained in common fuels, solvents, and cleaning fluids.

Vegetative Support Material — A portion of the soil cover, just beneath the topsoil, that is sufficiently porous to provide a base for grasses and other plants that may be seeded on top of the soil cover.

Water Table — The surface between the zone of saturation and the zone of aeration; the surface of a body of unconfined groundwater at which the pressure is equal to that of the atmosphere.

Wetlands— An area of land characterized by swamps, marshes, or flora and fauna that prefer wet environments.

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MARYLAND DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway! Baltimore Maryland 21224 (410) 631- 3000! 1- 800-633-6101! http://www.mde.state.md.us

Parris N. Glendening Governor

Jane T. Nishida Secretary

January 27, 2000

Mr. Bayly Smith Naval Air Station 22445 Peary Road – PVD Mailstop 28 Patuxent River MD 20670-5309

RE: Record of Decision for Operable Unit 1, Site 1, Fishing Point Landfill and Site 2, Rifle Range Landfill, Patuxent River Naval Air Station

Dear Mr. Smith:

The Maryland Department of the Environment, Waste Management Administration (MDE/WAS) has completed its review of the above-referenced document. This Record of Decision documents the Navy's decision to install a soil cover on Sites 1 and 12, which are former disposal areas in the Fishing Point area of the Patuxent River Naval Air Station. The Navy is conducting this action in compliance with the Comprehensive Environmental Response, Compensation and Liability Act.

The soil cover is intended to prevent exposure of human and ecological receptors to the wastes and thereby mitigate the associated risks. This decision incorporates a variance to the State's landfill closure requirements for sanitary landfills, which was granted by the MDE/WAS in correspondence dated November 8, 1999.

Based upon the acceptable level of protection to human health and the environment provided by the remedy, the Maryland Department of the Environment concurs with the selected remedy. If you have any questions, please contact me at (410) 631-3394.

Sincerely,

Kim Lemaster Section Head

Federal/NPL SuperfUrid, Division

- Cin Lements-

KL:bjm

cc: Ms. Kim Parker

Mr. Andrew Sochanksi Mr. Richard Collins Mr. Karl Kalbacher

In The Matter Of:

SITE 1, FISHING POINT LANDFILL SITE 12, LANDFILL BEHIND RIFLE RANGE

November 9, 1999

For The Record, Inc.
Court Reporting and Litigation Support
603 Post Office Road
Suite 309
Waldorf, MD USA 20602
(301) 870-8025 FAX: (301) 870-8333

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Word Index included with this Min-U-Script ${\mathbin{\mathbb R}}$

Appendix A Letter of Concurrence

Appendix B Public Meeting Transcript

	Page 1			Page 3
[1]				
[2]		[1]	encourage your comments. Public comment	
[3]		[2]	questions of the alternatives are important.	
[4]	PROPOSED REMEDIAL ACTION PLAN	[3]	It's important that you clearly understand what the	
[5]	SITE 1, FISHING POINT LANDFILL	[4]	alternatives are and why we selected what we	
[6]	AND	[5]	have and what our plans are. I'm pleased to have	
[7]	SITE 12, LANDFILL BEHIND RIFLE RANGE	[6]	you here. And I'll turn it over to Donna Jordan	
[8]	OPERABLE UNIT 1 - (AREAS A, B, C, S, AND F)	[7]	who will start the brief.	
[9]	PUBLIC HEARING	[8]	MS. JORDAN: Good evening. How's	
[10]	NOVEMBER 9, 1999	[9]	everyone this evening? My name is Donna Jordan	
[11]		[10]	and I'm the outgoing remedial project manager for	
[12]		[11]	the Naval Air Station Patuxent River, Maryland.	
[13]		[12]	Kim Parker, to my right, is going to be taking over	
[14]		[13]	as going to the new project manager.	
[15]		[14]	I know a couple months ago at the last	
[16]		[15]	proposed planning we introduced another	
[17]	The public hearing was taken on Tuesday,	[16]	individual who was going to be taking over, Jeff	
[18]	November 9, 1999, commencing at 6:42 p.m., at the	[17]	Waite. Jeff Waite has been reassigned to another	
[19]	Frank Knox Training Center, Patuxent River,	[18]	project.	
[20]	Maryland before Mary Claire Ochsner-Hammond,	[19]	We were lucky to get Kim from the Army	
[21]	Notary Public.	[20]	and she has a lot of experience in working with	
[22]		[21]	restoration sites. So, Kim is going to be taking	
		[22]	over and she and I are going to do the	
	Page 2			Page 4
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[1]	PROCEEDINGS			Tuge T
[2]		[1]	presentation together. So, you'll get a chance to	Tuge 1
[2] [3]	PROCEEDINGS	[1] [2]	hear from Kim as well this evening.	Tuge I
[2] [3] [4]	PROCEEDINGS CAPTAIN ROBERTS: Good evening. I guess		hear from Kim as well this evening. We're here to talk about the proposed plan	Tage 1
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		Page 5			Page 7
[1]	the process for evaluating and remedying sites				
[2]	that were used as past disposal sites. We go		[1]	don't have a pointer, but here in the far corner is	
[3]	from site discovery, we do some inspection. We		[2]	where the trash was placed, Site 1.	
[4]	do a feasibility study. Then we get to the		[3]	Now you can look at the shore and you're	
[5]	proposed plan and the Record of Decision.		[4]	going to see the shoreline is going to change in	
[6]	So, once we finish the proposed plan		[5]	the next couple of pictures. This is where we	
[7]	phase, then we must document the decision that we're		[6]	had to install the breakwaters as part of the	
[8]	planning to take at the site. We go from		[7]	removal action I mentioned that we had to take	
[9]	that to a design remedy and then implementing the		[8]	because we had landfill material coming out into	
[10]	remedy, which is called the remedial action.		[9]	the river. So, we had to build part of the beach	
[11]	Then we monitor the remedy to make sure it's still		[10]	back up and this is what it looked like when it	
[12]	effective.		[11]	was finished, with the breakwaters installed.	
[13]	Site background. For those of you who		[12]	If you look up in that far corner where you	
[14]	have been here for several years we've been working on		[13]	see it's curved, we're experiencing some	
[15]	this, just a refresher. Site 1		[14]	erosion in that area now. And that's an area	
[16]	landfill had operated from 1960 to 1974. It		[15]	we're going to take care of along with when we	
[17]	served as the main disposal site for Pax River. Here's a		[16]	put in the remedy for the landfill site.	
[18]	list of some of the items that were placed into the		[17]	This is what it looks like now if you	
[19]	landfill.		[18]	were to go out there. The beach grasses were	
[20]	Site 12 was actually adjacent to Site 1.		[19]	planted. The natural resources persons $-I$	
[21]	We're going to show you a map of those two sites and		[20]	think they have a group of students that come	
[22]	you can see that they are co-located.		[21]	out and do some grass planting and then a couple	
			[22]	years ago Captain Standridge had closed off	
		Dogg 6			D 0
		Page 6			Page 8
[1]	Actually, it was used a little bit earlier. It	rage o			rage 8
[1] [2]	has some of the same materials placed in it.	rage o	[1]	access to the Fishing Point Landfill Area and this	Page 8
	has some of the same materials placed in it. Site 12 is also adjacent to a marsh or a wetland	rage o	[1] [2]	gave the grass a chance to grow.	rage 8
[2] [3] [4]	has some of the same materials placed in it. Site 12 is also adjacent to a marsh or a wetland area and I'll show you that on the map as we get further	rage o		gave the grass a chance to grow. So, this is what it would look like now	rage 8
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[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21]	has some of the same materials placed in it. Site 12 is also adjacent to a marsh or a wetland area and I'll show you that on the map as we get further into the discussion. A list of past activities we've done at this site. We started with the site, as far as putting the site in the program for investigation, back in 1984. Then we started doing some preliminary work in '85 and then on through various phases of the investigation. In '93 we had a removal action where we took an interim type of action because we did have some landfill material that was going out to the river due to the erosion from all the storms that had come through. So, we did take removal action to take care of that. We just recently finished up the remedial investigation and also the feasibility study. So, now we're in the proposed plan. Not a very good picture, but this is a picture from	rage o	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19]	gave the grass a chance to grow. So, this is what it would look like now if you had a chance to go out there. This is that corner that I was talking about earlier where we're experiencing some erosion over the years from the storms coming in. You can see the downed trees. So, we're going to be taking a look at that and fixing that up as part of the remedy. From studying the landfill we've actually broken it up into several different areas. Area A, up at the top, is an area up on the hill and basically it's just what we consider clean fill. It's just concrete, rubble, debris up in that area. The main landfill is Area B which is Site 1 and Area D is Site 12. Area E is the wetland that I mentioned or the marsh area that's adjacent to the landfill. Area C is just a	rage 8
[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20]	has some of the same materials placed in it. Site 12 is also adjacent to a marsh or a wetland area and I'll show you that on the map as we get further into the discussion. A list of past activities we've done at this site. We started with the site, as far as putting the site in the program for investigation, back in 1984. Then we started doing some preliminary work in '85 and then on through various phases of the investigation. In '93 we had a removal action where we took an interim type of action because we did have some landfill material that was going out to the river due to the erosion from all the storms that had come through. So, we did take removal action to take care of that. We just recently finished up the remedial investigation and also the feasibility study. So, now we're in the proposed plan. Not	rage o	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21]	gave the grass a chance to grow. So, this is what it would look like now if you had a chance to go out there. This is that corner that I was talking about earlier where we're experiencing some erosion over the years from the storms coming in. You can see the downed trees. So, we're going to be taking a look at that and fixing that up as part of the remedy. From studying the landfill we've actually broken it up into several different areas. Area A, up at the top, is an area up on the hill and basically it's just what we consider clean fill. It's just concrete, rubble, debris up in that area. The main landfill is Area B which is Site 1 and Area D is Site 12. Area E is the wetland that I mentioned or the marsh area that's adjacent to the landfill. Area C is just a little ravine area where we found some surface	rage 8

[2] dimped some metal decks and file cabines and we [2] dimped some metal decks and file cabines and we [3] want to get that taken out as part of the remedy [4] for this area. Area F is an area that a long [5] time age was used as horwow some to cover some [6] of the trash that you are in 1974 phus. [7] CAPTAIN ROBERTS: Was used for what? [7] So couldn't beat. [8] couldn't beat. [9] MS, JORDAN. Bornw source, Area F, they 10] had alkeen some of the soul and put it on top of [11] the area and then later – and I'll point out and [12] dicess as we get further into the discussion – [8] we had an application of sladeg and I'll talk [12] dicess as we get further into the discussion – [8] shout that a fulle bit later in the [13] we had an application of sladeg and I'll talk [14] about that a fulle bit later in the [15] presentation. [16] But those are the areas that we were [17] subjying for this landfill. Okay, What we had she discussing the landfill site, is to beak the [18] dicticated took, as we were going further into the 213 sikes up that to took, as we were going further into the 214 sikes up that to took, as we were going further into the 215 data. They were going out and cleaning up some [18] dicticated took, as we were going further into the 215 data they had of different sites they were [19] sikes up that to took, as we were going further into the 215 data they had of different sites they were [19] sikes up that to took, as we were going further into the 215 data. They were going out and cleaning up some [18] of these sites, they looked back over all the 215 data they had of different sites they were [19] sikes up that to cook, as we extract the application of Alaey data down and a section of the section		Page 9		Page 11
23 Secure we need to cover the landfill	[1]	Someone had come out there and just		
13 aca, there are some wetlands in that Area B that 15 time ago was used as borrow source to cover some 16 of the trash that you saw in 1974 photo. 17 CAPTAIN ROBERTS: Was used for what? 1 18 couldn't hear. 19 MS. JORDAN: Borrow source, Area F, they 10 had taken some of the soil and put it on top of 11 the area and then later – and I'll point out and 12 discuss as we get further into the discussion – 13 whe had an application of studge and I'll talk 14 about that a little bit hater in the 15 presentation. 16 Bot too are the areas that we were 17 studying for this landfill. Okay. What we had 18 decided to do, as we were going further into the 19 study and looking at the alternatives for 19 study and looking at the alternatives for 10 addressing the landfill sites, is to break the 11 areas. Basically everything you saw in there 12 except for Area F, which is the marsh, the 13 we're still going to do some additional studying 16 of for ecological purposes, but we didn't wan to 17 what we're trying to accomplish out 18 with the landfill contents in the surface water 19 implement the remedy and still continue 10 avertagating that portion. 11 what we're trying to accomplish out 12 berr, No. 1, is to protect human health and the 13 environment, We want to make sure we're 14 complying with all state and federal regulations. 15 We want to prevent or minimize contact 16 with the landfill contents in the surface water 17 we're looking at polential scenarios 18 could happen. We look at a fifects or to body, a look at look and total risk. 18 containment, which is some type of loover or cap. 19 implement the remedy and still continue 10 which we had not prevent the main and the 11 established remedy that we can work toward. That	[2]	dumped some metal desks and file cabinets and we	[1] will be impacted.	
[4] was shown up there, we'll need to mitigate for [5] that. So, we'll need to replace and put in wet [6] of the trash that you saw in 1974 photo. [5] that. So, we'll need to replace and put in wet [6] of the trash that you saw in 1974 photo. [6] lands to make up for what is going to be lost [7] during the construction. [8] I'm going to talk a little bit about use [9] of a presumptive remedy. A presumptive remedy [10] had raken some of the soil and put it on top of [11] the area and then later – and I'll point out and [12] discuss as we get further into the discussion – [13] we had an application of sludge and I'll talk [14] about that a little bit later in the [15] presentation. [14] of these sizes, they looked back over all the [15] presentation. [14] of these sizes, they looked back over all the [15] data they had of different sizes they were [16] working on and different remedies that were [16] working on and different remedies that were [17] study and looking at the alternatives for [18] data they had of different sizes they were [18] with your operable units. [19] and rest, which is the marsh, the [18] operable Unit 1 is just those five [19] of or for cological purposes, but we didn't wan to [19] of or for cological purposes, but we didn't wan to [19] of or for cological purposes, but we didn't wan to [19] implement the remedy and still continue [19] implement the remedy and still continue [19] interesting the protrion. [19] what we're rying to accomplish our [19] even well to great the remedy and still continue [19] interesting that protrion. [19] was to prevait the remedy and still continue [19] interesting the protrion. [19] was to prevait the remedy and still continue [19] and we want to be cost-effective. We also want to [19] the work to what's actually happened, but what [19] and we want a chance to try to enhance the [19] and we want a chance to try to enhance the [19] and we want a chance to try to enhance the [19] and we want a chance to try to enhance the [19] and we want a chance to try to enha	[3]	want to get that taken out as part of the remedy	[2] Because we need to cover	the landfill
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[21] reduce groundwater from further contaminating the [22] surface water and then some of the wetland that [23] areas, tissues and organisms that are affected by [24] certain chemicals and we look at total risk [25] associated with this site.	[19]	and we want a chance to try to enhance the	[18] could happen. We look at affect	cts on the body,
[22] surface water and then some of the wetland that [21] certain chemicals and we look at total risk [22] associated with this site.	[20]	habitat through revegetation. We also want to	[19] the whole body, or maybe there	e are only target
[22] associated with this site.	[21]	reduce groundwater from further contaminating the	[20] areas, tissues and organisms that	at are affected by
	[22]	surface water and then some of the wetland that	[21] certain chemicals and we look	at total risk
For The Record, Inc. – (301)870-8025 Min-U-Script® (5) Page 9 - Page 12			[22] associated with this site.	
	or The	e Record, Inc (301)870-8025 Min-U-	ript®	(5) Page 9 - Page 12

	Page 13			Page 15
[1]	So, we would look at all the pathways.			
[2]	We would look at groundwater, surface water,	[1]	that. That's what we look at when we're doing a	
[3]	sediments and soil. We will total those up. So	[2]	risk assessment.	
[4]	risk assessment just tries to answer the question	[3]	We're also looking at other health	
[5]	what if.	[4]	effects, other changes in the body from coming in	
[6]	How is the risk evaluated? There are	[5]	contact with this specific chemical. If certain	
[7]	three key components to assessing the risk. One	[6]	chemicals may cause a rash, if you come in	
[8]	is having your chemicals of concern. The	[7]	contact with it, that's something that would be	
[9]	chemicals of concern are determined from your	[8]	considered a change in the body.	
[10]	sampling results when you go out and we take soil	[9]	Those of you who have allergies	
[11]	samples and we get data back from the lab saying	[10]	sometimes pollen will trigger an allergy. That's	
[12]	these are the chemicals that we found in this	[11]	considered a health effect. You'll start	
[13]	soil sample and this is the amounts that we	[12]	sneezing, runny nose, watery eyes, those are	
[14]	found.	[13]	samples of health effects.	
[15]	We compare those levels to established	[14]	What EPA established for health effects	
[16]	levels from EPA and if we are above that level,	[15]	is you need to have an index less than one. That	
[17]	we retain that chemical. We say that chemical is	[16]	means if you have a specific amount of chemical	
[18]	now a chemical of concern. So, we're going to	[17]	and compared that to an EPA established level,	
[19]	look at that when we're evaluating and trying to	[18]	that ratio needs to be less than one and that's a	
[20]	assess the risk at that site.	[19]	very, very conservative figure that is set by	
[21]	The next component is a pathway. What	[20]	EPA.	
[22]	is the route of exposure? Where do we find it?	[21]	They are taking into account the elderly	
		[22]	and the very young and people who are very	
	Page 14			Page 16
	_			Tage 10
[1]	We find it in the soil and, therefore, people may			Tage 10
[2]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find	[1]	sensitive, have very sensitive bodies or	Tage To
[2] [3]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater?	[2]	reactions. So, they set those levels very, very	Tage 10
[2] [3] [4]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in	[2] [3]	reactions. So, they set those levels very, very conservatively.	Tage 10
[2] [3] [4] [5]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at	[2] [3] [4]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12,	Tage 10
[2] [3] [4] [5]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have	[2] [3] [4] [5]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer,	Tage 10
[2] [3] [4] [5] [6] [7]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off	[2] [3] [4]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far	Tage 10
[2] [3] [4] [5] [6] [7] [8]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things	[2] [3] [4] [5] [6] [7]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three	Tage 10
[2] [3] [4] [5] [6] [7] [8]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In	[2] [3] [4] [5] [6] [7] [8]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a	Tage 10
[2] [3] [4] [5] [6] [7] [8] [9]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three	[2] [3] [4] [5] [6] [7] [8] [9]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an	Tage 10
[2] [3] [4] [5] [6] [7] [8] [9] [10]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three of these must be present.	[2] [3] [4] [5] [6] [7] [8] [9]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an adult resident.	Tage 10
[2] [3] [4] [5] [6] [7] [8] [9] [10] [11]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three of these must be present. When we look at human health risk we	[2] [3] [4] [5] [6] [7] [8] [9] [10]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an adult resident. What this means is they would have to	Tage 10
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[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three of these must be present. When we look at human health risk we look at human health risk a little bit differently than eco. I'm just going to start with the human health first. Human health	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an adult resident. What this means is they would have to actually drink this groundwater. They'd have to drink – for an adult to drink two liters of this groundwater every day for a period of 20 years.	Tage 10
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[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three of these must be present. When we look at human health risk we look at human health risk a little bit differently than eco. I'm just going to start with the human health first. Human health effects. We use an established EPA methodology for evaluating the risk.	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an adult resident. What this means is they would have to actually drink this groundwater. They'd have to drink — for an adult to drink two liters of this groundwater every day for a period of 20 years. No one is drinking that groundwater today. There are no plans for anyone to drink that groundwater	Tage 10
[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three of these must be present. When we look at human health risk we look at human health risk a little bit differently than eco. I'm just going to start with the human health first. Human health effects. We use an established EPA methodology for evaluating the risk. We have acceptable range levels of risk.	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an adult resident. What this means is they would have to actually drink this groundwater. They'd have to drink – for an adult to drink two liters of this groundwater every day for a period of 20 years. No one is drinking that groundwater today. There are no plans for anyone to drink that groundwater tomorrow, but like I mentioned earlier, we have	Tage 10
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[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20]	We find it in the soil and, therefore, people may be coming in contact with the soil. Do we find it in the groundwater? And then who or what will come in contact with this pathway? Are we looking at sediments in the marsh? And you're going to have habitat in there that are going to be feeding off of that sediment. Those are the three things that we look at during risk assessments. In order for an actual risk to be there, all three of these must be present. When we look at human health risk we look at human health risk a little bit differently than eco. I'm just going to start with the human health first. Human health effects. We use an established EPA methodology for evaluating the risk. We have acceptable range levels of risk. From 1 to 10,000 to 1 in a million excess cancer risk and what that means is in addition to	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21]	reactions. So, they set those levels very, very conservatively. For the groundwater for Sites 1 and 12, as far as groundwater ingestion for any cancer, we are below EPA's risk range for that. As far as other health effects, there were three chemicals that were identified that show a potential and this is based on a future child or an adult resident. What this means is they would have to actually drink this groundwater. They'd have to drink — for an adult to drink two liters of this groundwater every day for a period of 20 years. No one is drinking that groundwater today. There are no plans for anyone to drink that groundwater tomorrow, but like I mentioned earlier, we have to look at what if. What if someone decided to take that	Tage 10

	Page 17			Page 19
[1]				Ü
[2]	period of 25 years.	[1]	organisms that are out there to look at what are	
[3]	Soils, surface water and sediment. The	[2]	the health effects for them.	
[4]	soils within the landfill – because we're using	[3]	An example of that would be reproduction	
[5]	a presumptive remedy approach here, the	[4]	rates, if they're failing off, effects of	
[6]	presumptive remedy approach says we're talking	[5]	offspring, if their eggshells are thinning or if	
[7]	about a landfill, you look at the types of	[6]	they're having a shortened life span. This is	
[8]	material that were placed in the landfill and you	[7]	the type of ecological assessment that we would	
[9]	just go ahead and presume that if you came in	[8]	do.	
[10]	contact with those materials in the landfill,	[9]	For Operable Unit 1, which were the five	
[11]	there is a potential risk.	[10]	areas I mentioned earlier: A, B, C, D, and F, we	
[12]	Therefore, you don't go in and spend a	[11]	did not took at the soils within the landfill	
[13]	lot of time and effort taking samples from the	[12]	because this is a presumptive remedy. We assume	
[14]	site of the landfill and evaluating them. Use	[13]	those create a potential risk. We don't look at	
[15]	that money to look at the impacts around that	[14]	those.	
[16]	landfill.	[15]	We looked at the surface water and	
[17]	So, we concentrated on the soil outside	[16]	the sediments around there and we found we	
[18]	the landfill because the presumptive remedy	[17]	didn't have any ecological risk. The soil from	
[19]	approach says we're going to put in some type of	[18]	Area E we did find it exceeded and we started	
[20]	cover, some type of containment system for that.	[19]	questioning why in this one particular area were	
[21]	So, we looked at the soil surrounding	[20]	we having this exedence of metals? We couldn't	
[22]	the landfill and we found that we were within the	[21]	figure it out. Why in this particular area?	
		[22]	We started going back through some of	
	Page 18			Page 20
	1450 10			rage 20
[1]				rage 20
[1] [2]	-	[1]	the historical records and found out that in that	rage 20
	EPA's acceptable risk for the soils surrounding	[1] [2]	the historical records and found out that in that one area, Area F, there was a permanent sludge	rage 20
[2]	EPA's acceptable risk for the soils surrounding the landfill sampling of the surface water and			rage 20
[2] [3]	EPA's acceptable risk for the soils surrounding the landfill sampling of the surface water and sediment. We look at the surface water around	[2]	one area, Area F, there was a permanent sludge application. Does anyone not know what sludge is?	rage 20
[2] [3] [4]	EPA's acceptable risk for the soils surrounding the landfill sampling of the surface water and sediment. We look at the surface water around the edges of the landfill and the sediments and	[2] [3]	one area, Area F, there was a permanent sludge application. Does anyone not know what sludge is? It came from St. Mary's Wastewater	rage 20
[2] [3] [4] [5]	EPA's acceptable risk for the soils surrounding the landfill sampling of the surface water and sediment. We look at the surface water around the edges of the landfill and the sediments and we were okay there.	[2] [3] [4]	one area, Area F, there was a permanent sludge application. Does anyone not know what sludge is? It came from St. Mary's Wastewater Treatment Plant and sludge was brought on and it	rage 20
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[2] [3] [4] [5] [6] [7] [8]	EPA's acceptable risk for the soils surrounding the landfill sampling of the surface water and sediment. We look at the surface water around the edges of the landfill and the sediments and we were okay there. Now I'm going to talk a little bit about ecological risk. Ecological risk is approached a little bit differently because there's so many	[2] [3] [4] [5] [6] [7]	one area, Area F, there was a permanent sludge application. Does anyone not know what sludge is? It came from St. Mary's Wastewater Treatment Plant and sludge was brought on and it was permitted and placed over Area F and that	rage 20
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[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13]	EPA's acceptable risk for the soils surrounding the landfill sampling of the surface water and sediment. We look at the surface water around the edges of the landfill and the sediments and we were okay there. Now I'm going to talk a little bit about ecological risk. Ecological risk is approached a little bit differently because there's so many different species. Unlike humans, it's hard to have one particular model that we can evaluate to represent the human population. We start off sort of in the same way with identifying chemicals of concern, taking	[2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12]	one area, Area F, there was a permanent sludge application. Does anyone not know what sludge is? It came from St. Mary's Wastewater Treatment Plant and sludge was brought on and it was permitted and placed over Area F and that was to enhance vegetation. Since they had earlier used that as a borrow source at one time to cover up some of the landfill material, they wanted to revegetate that, and sludge is good thing to use to	rage 20
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	Page 21			,	Page 23
[1]	additional work in there. We did the screening				
[2]	that I mentioned in the eco piece, comparing it		[1]	balancing criteria, which has five different	
[3]	to EPA levels. We were above.		[2]	factors associated with that.	
[4]	We need to now go in there and look at		[3]	Table 2, which is shown in your proposed	
[5]	the habitat that we have in that area and look at		[4]	plan, outlines that and it shows the long-term	
[6]	the impact and effects to them. This is going to		[5]	effectiveness, the reduction in toxicity,	
[7]	take some time to do because we have to go out		[6]	implementability and you look at your short-term	
[8]	and put together a work plan to work from and get		[7]	effectiveness and also considers your cost.	
[9]	an idea of what we're going to do, get the		[8]	Basically, the primary balancing	
[10]	biological technical assistance from the EPA to		[9]	criteria and the threshold criteria are the	
[11]	help us with that.		[10]	technical factors that we considered. We also	
[12]	So we know sometime in the future we're		[11]	look at the – or consider modifying criteria,	
[13]	going to be ready to announce: This is what we		[12]	which is where we talk with the state and we	
[14]	did. This is what we found and this is what the		[13]	partner with the state and make sure the state	
[15]	proposed plan is for Operable Unit 2.		[14]	provides their buy in to what we're doing so they	
[16]	Now I'm going to turn this over to Kim		[15]	will - we have to actually get state acceptance	
[17]	Parker and she's going to go through the			and community acceptance, which is basically	
[18]	evaluation and the alternatives. Kim?		[17]	what we're doing here.	
[19]	MS. PARKER: Thank you, Donna. Good		[18]	We're giving you-all the opportunity to	
[20]	evening. I'm going to talk a little bit about		[19]	comment on the proposed plan and also we – as	
[21]	the evaluation of the alternatives and how we		[20]	you know, we have a 30-day response period –	
[22]	came to select what the remedy that we had for			public response period, which we also consider in	
	·			evaluating the remedy.	
	Page 22				Page 24
[1]	this site.				
[2]	Basically, you see up here we have the		[1]	So, we're not going to just be actually	
[3]	national - we used the National Contingency Plan		[2]	looking at technical factors solely. We're also	
[4]	or NCP, which is used as an overall federal		[3]	going to consider what the public considers to	
[5]	guidance in evaluating sites for environmental		[4]	actually be an issue with the site and the state	
[6]	sites and installation restoration sites in		[5]	will also take a look at that to see if that will	
[7]	selecting an alternative.		[6]	be a factor in determining the appropriate remedy	
[8]	EPA has approved the National		[7]	for the site.	
[9]	Contingency Plan, and the NCP basically goes to		[8]	Now, the alternatives that we evaluated	
[10]	outlining the evaluation process. It's based on		[9]	in the – actually, let me back up to the	
[11]	nine criteria. The criteria is shown in your		[10]	feasibility study, which if you-all haven't seen	
[12]	proposed plan. One is a threshold criteria,		[11]	a copy of it, we have a copy actually here.	
[13]	which is based on two factors as you see		[12]	The feasibility study is basically done	
[14]	mentioned here, two sources of criteria.		[13]	before the proposed plan. It's done after the	
[15]	One is the overall protection of human		[14]	remedial investigation where we actually list our	
[16]	health and the environment. Basically, human		[15]	alternatives that were selected. We had five	
[17]	health and the eco portion of it and then the		[16]	that were initially listed, but two of those	
[18]	compliance with your ARARs that's mentioned and		[17]	alternatives were in reference to the marsh or the	
[19]	that's shown in your proposed plan and that's		[18]	wetlands.	
[20]		1		So, we – since we actually decided, as	
[20]	what we - that's basically a technical portion		[19]	50, we – since we actually decided, as	
[21]				Donna mentioned earlier, to put that as part of	
	what we - that's basically a technical portion		[20]	•	

[1] alternatives to actually consider. So that's [2] what you see listed berne. [3] We have Alternative 1, which is no [4] action, not doing anything at all. Then we have [5] Alternative 2, which would be installing a [6] vegetative soil cover, which would be a cover expense of the control		Page 25			Page 27
21 whit you see listed here. 11 we felt that this alternative would still be able 21 to allow us to reduce that risk and bea hab it 21 to allow us to reduce that risk and bean hab it 21 to allow us to reduce that risk and bean hab it 21 to allow us the reduce the most of 21 to allow us well and fill 21 to allow us well and it 22 to allow us would be a cover 21 to allow us requirements. They have a landfill 22 to allow us requirements. They have a landfill 23 to allow us requirements. They have a landfill 24 to allow us requirements. They have a landfill 25 to allow us requirements. They have a landfill 25 to allow us requirements. They have a landfill 25 to allow us requirements. They have a landfill 25 to allow us requirements. They have a landfill 25 to allow us requirements. They have a landfill 25 to allow us requirements. They have a landfill 25 to allow us requirements of us symble us the land us allow us requirements of us symble us the land u	[1]	-			1 450 27
[3] We have Alternative 1, which is no [4] action, not doing anything at all. Then we have [5] Alternative 2, which would be installing a [5] expertative soil cover, which would be a cover [7] over Areas B and D, as Donns had mentioned before [8] you saw where Areas B and D were. [7] over Areas B and D were. [8] over Papera and Share B and D were. [8] over Papera and Share B and D were. [8] over Papera and Share B and D were and Share B and Sha		•	[1]	we felt that this alternative would still be able	
[3] action, not doing anything at all. Then we have [5] Alternative 2, which would be installing a [6] vegetative soil over, which would be a cover [7] over Areas B and D, as Donna had mentioned before [8] you saw where Areas B and D wer. [9] Then we would be accurating debris from [10] Area C and actually disposing of it off-site. [11] We'd be actually installing institutional [12] controls and having long-term monitoring. [13] The third alternative would be almost [14] the same as Alternative 3, except we would [15] actually where ARCAs Sebutic D cap, which is basically [16] a liner, which is included in the — in [17] the landfill along with the soil cap, [18] And that would also be — it would [19] actually do the same thing with the excavation of [20] the containated material and disposing of it [21] off-site and still have institutional controls and [22] long-term monitoring. [23] long-term monitoring. [24] I You also see that we included the cost [25] between the two and there is a substantial [26] illuser and you normally have to get a specialty [27] contractor to come in to install that. So., it [28] does increase the cost as you see here. [29] Now, the preferred alternative which was selected [20] was Alternative 2, ast I mentioned [21] earlier, was a soil cover, vegetative [22] ool cover, which involves 6 inches of top yoil [23] and 18 inches of absola, which gives you a total [24] of 2 feet, has 2 percent slope's and we're going [25] to be reviewing it over a five-year period. This is [26] of 19] soil and a liner on the material of the differences between [27] which EPA has asked us or hus mandated that we [28] one period factor here, a liner would not list if was beeled in because Alternative 2 and 3 both [29] energy which live that we selected. The main reason [20] comply with. [21] difference in actually having a liner in the cap.		-			
Same Alternative 2, which would be installing a [4] The only situation with Alternative 2 is Same yeapetative sail cover, which would be a cover Same yeapetative sail cover, which would be a cover Same yeapetative sail cover, which would be a cover Same yeapetative sail cover, which would be a cover Same yeapetative sail cover, which would be a cover Same yeapetative sail cover, which would be a cover Same yeapetative sail y					
5 that we would have to request a variance from the 7 over Areas B and D, as Donna had mentioned before 8 you saw where Areas B and D were. 7				-	
So you saw where Areas B and D were. 16 State of Maryland because of their landfill 7 closure requirements. They have a landfill 7 closure requirements for a synthetic liner. 10 Area C and actually disposing of it off-site. 19 We've been partnering, talking with the 11 We'd be actually installing institutional 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 with giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the main reason 11 whith giving us this variance, but the wariance 12 whith giving us this the groundwater 13 we feel this it's beneficial to get the variance 13 whith giving us this the groundwater 14 whith giving us this the groundwater 15 whith giving us this the groundwater 16 whith giving us this the groundwater					
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	P	age 29			Page 31
[1]	prohibits installation of shallow drinking water	uge 2>			1 4 5 6 7
[2]	wells and that's a requirement. That's basically because		[1]	it's talking about a stream, but you have a	
[3]	they don't feel that the drinking water			pretty big stream out there. The Patuxent River	
[4]	levels – they don't allow you to install the			is a major water body that receives quite a bit	
[5]	water wells.			of groundwater. You have groundwater that not	
[6]	They don't think that that would			only flows directly horizontally towards the	
	actually be an issue where infiltration would			river, but there's actually upward flow into the	
[7]	come into play. We don't – that would not – because			• •	
[8]				river and you see a little bit of that coming up here.	
[9]	they're not allowing us to do that, that would not be an				
[10]	issue that would be – that would have to be considered		[9]	That water that's deep below the bottom	
[11]	with installing a liner.			of the river is actually still flowing into the	
[12]	The Class III aquifer. A Class III			river. And then the other thing that I wanted to	
[13]	aquifer, I don't know if you-all know, that's basically an			mention is that there's a major confining unit.	
[14]	aquifer that has a high salinity		[13]	The St. Mary's formation is a major,	
[15]				very thick – I believe it's 200 to 250 feet –	
[16]	that's actually in between the landfill			confining unit and the drinking water that	
[17]	and the river – the Patuxent River.			you-all have as a source in St. Mary's County	
[18]	So, if we did try to actually come in			comes from aquifers that are below that confining	
[19]	and install a well in between the landfill			unit. That confining unit prevents significant	
[20]	and the river, it wouldn't give us any benefit in			flow - groundwater flow downwards toward that	
[21]	trying to determine what the levels of		[20]	other aquifer that you get your drinking water	
[22]	contamination were there because you'd be getting		[21]	from.	
			[22]	ATTENDEE: So, are the contaminants that	
	Tr.				
		age 30			Page 32
	high salinity levels.	age 30			Page 32
[1] [2]	high salinity levels. I wanted to – Linnea Eng, who's our	age 30		are contained within this, they're going into the	Page 32
	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant.	age 30		Patuxent?	Page 32
[2]	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant. She's with CH2M Hill. She has a diagram here and I'll	age 30	[2] [3]	Patuxent? MS. ENG: Yes.	Page 32
[2]	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant. She's with CH2M Hill. She has a diagram here and I'll let her come up and just talk a little bit	age 30	[2] [3] [4]	Patuxent? MS. ENG: Yes. ATTENDEE: Because it's so diluted by	Page 32
[2] [3] [4]	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant. She's with CH2M Hill. She has a diagram here and I'll let her come up and just talk a little bit about the groundwater and the aquifer.	age 30	[2] [3] [4]	Patuxent? MS. ENG: Yes.	Page 32
[2] [3] [4] [5]	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant. She's with CH2M Hill. She has a diagram here and I'll let her come up and just talk a little bit	age 30	[2] [3] [4] [5]	Patuxent? MS. ENG: Yes. ATTENDEE: Because it's so diluted by	Page 32
[2] [3] [4] [5] [6]	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant. She's with CH2M Hill. She has a diagram here and I'll let her come up and just talk a little bit about the groundwater and the aquifer.	age 30	[2] [3] [4] [5]	Patuxent? MS. ENG: Yes. ATTENDEE: Because it's so diluted by the salt water that it's going into, it's not a	Page 32
[2] [3] [4] [5] [6] [7] [8]	high salinity levels. I wanted to – Linnea Eng, who's our contractor on the project – our consultant. She's with CH2M Hill. She has a diagram here and I'll let her come up and just talk a little bit about the groundwater and the aquifer. MS. ENG: Hi everybody. I just wanted	age 30	[2] [3] [4] [5] [6] [7]	Patuxent? MS. ENG: Yes. ATTENDEE: Because it's so diluted by the salt water that it's going into, it's not a health risk for the organisms out there then?	Page 32
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		Page 33			Page 35
[1]	deep is that?		[1]	So, again that risk assessment, that's	
[2]	MS. ENG: We did not – not all of our		[2]	some pretty conservative scenarios that were	
[3]	wells have reached the confining unit. So, I		[3]	looked at as far as putting a residential well in	
[4]	can't actually tell you the exact depth in all		[4]	this area. Nobody is going want to drink the	
[5]	areas, but I believe it's about 100 feet deep.		[5]	water from that well for 25 years. It's going to	
[6]	We actually have wells that go - that went into		[6]	taste pretty bad.	
[7]	the St. Mary's formation.		[7]	CAPTAIN ROBERTS: So, we looked at this	
[8]	The upper part of that formation is		[8]	just as a what if. Is that correct?	
[9]	fairly permeable. It's not as permeable as		[9]	MS. ENG: Yes.	
[10]	what's right up close to the surface, but it is		[10]	CAPTAIN ROBERTS: But nobody - you're	
[11]	more permeable. We considered that there is a		[11]	not allowed to put a well there and if you did,	
[12]	continuous confining unit high up there, but down		[12]	it was going to be saline to where you couldn't	
[13]	below about 100 feet there's the St. Mary's		[13]	use it for anything, is that correct?	
[14]	formation that is present throughout this area.		[14]	MS. ENG: That's right.	
[15]	CAPTAIN ROBERTS: I have a question. If		[15]	CAPTAIN ROBERTS: Okay.	
[16]	I understand the way we – that the aquifers for		[16]	ATTENDEE: Why does it only flow to the	
[17]	the water supply for St. Mary's County it's		[17]	right?	
[18]	below this confining level because these are		[18]	MS. ENG: It only flows to the right?	
[19]	considered unreliable sources of potable water		[19]	ATTENDEE: Maybe it's only flowing to the	
[20]	because you have surface water that infiltrates,		[20]	right. Why doesn't it flow to the left?	
[21]			[21]	MS. ENG: I'm trying to think of the best way	
[22]	salines – saltwater content into it, et cetera,		[22]	explain this but what we look at is -	
		Page 34			Page 36
			[1]	it's the water level head in any area. The water	
[1]	you know, fertilizer off of your lawn could get		[2]	is continuous. If you can think of a – actually	
[2]	into this shallower amount of water. That's why		[3]	the water in a swimming pool. If you tipped – I	
[3]	that's not used, is that correct?		[4]	don't know if there is a good way to explain it.	
[4]	MS. ENG: That's correct, yes.		[5]	If you tipped the edge of the swimming pool up,	
[5]	CAPTAIN ROBERTS: Okay.		[6]	your water is going to flow towards the lower	
[6]	MS. ENG: In most parts of the country		[7]	area.	
[7]	nobody wants to put a drinking water well into a		[8]	ATTENDEE: But maybe the other drawing	
[8]	shallow unconfined aquifer for those very		[9]	was better because this shows a well being sunk.	
[9]	reasons. In this particular area, if we look at		[10]	MS. JORDAN: That's a production well	
[10]	the other slide, if you did put a well in, you		[11]	ATTENDEE: I think I understand, what	
[11]	would actually draw water back.		[12]	you're saying and what I'm saying is it seems like	
[12]	If you put a production well in that's		[13]	it implies the what's off the picture is	
[13]	actually going to produce any significant amount of		[14]	higher. If it's all based on height, but the	
[14]	water, you would actually draw water back from		[15]	land is causing it to move from left to right.	
[15]	the river into the well.		[16]	The reason I ask the question is –	
[16]	We're talking here about wells that are		[17]	another way of asking the question is how much	
[17]	in that strip of land between the landfill and		[18]	area is being affected on the back side or left	
[18]	the river downgradient and once you start drawing		[19]	of the rudder, north and south of what we're	
[19]	that water in, as you know I'm sure, the river is		[20]	seeing? How far is that? Because I understand	
[20]	pretty brackish. You start drawing water back		[21]	the Amish drink from that.	
[21]	from the river, you get brackish water and nobody		[22]	MS. ENG: You're talking about the local	
[22]	is really going to want to drink that.				

		Page 37			Page 39
[1]	flow system right here and there's - when you		[1]	asking.	
[2]	talk about groundwater flow, you can talk about		[2]	MS ENG: That's correct. There are	
[3]	local and regional groundwater flow and this is a		[3]	other areas of the base that flow may not be	
[4]	local flow system in your shallow aquifer.		[4]	toward the river, but in this area, it is flowing	
[5]	It does, to a certain extent, follow the		[5]	through.	
[6]	topography and that has to do with the way that the		[6]	ATTENDEE: All right.	
[7]	surface water infiltrates in different areas		[7]	CAPTAIN ROBERTS: If you look at the	
[8]	and where the confining units tend to be with		[8]	geography of that area, the road and everything	
[9]	respect to the topography, but the shallow		[9]	is up very high and this is a very significant	
[10]	aquifers we're talking about here really is		[10]	slope that comes down from the road right down on	
[11]	local. If you looked even someplace else on the		[11]	to the point and it all comes down right on to	
[12]	base, you might find – in fact you would find –		[12]	that point.	
[13]	ATTENDEE: Local –		[13]	So, I think what we're trying to say is	
[14]	MS. ENG: – that the flow might be		[14]	that geography in that particular area, when we	
[15]	towards some other water.		[15]	talked about it before was when we say local,	
[16]	ATTENDEE: Does local mean that it's		[16]	this is in the area of Fishing Point and there	
[17]	confined to the base in that direction? Just for		[17]	was another chart at one time that I had looked	
[18]	curiosity because, see, I don't know what you're		[18]	at –	
[19]	saying. If you say confined to the base, I could		[19]	MS. PARKER: Unfortunately, we didn't	
[20]	accept that as known. If that's not known, then		[20]	bring that one, the overflow of the base.	
[21]	I would have a question because there are people		[21]	CAPTAIN ROBERTS: That kind of showed	
[22]	drinking from that, as I understand it.		[22]	the geography and water flow from the top, which	
		Page 38			Page40
[1]	MS. ENG: I'm not sure if I know		[1]	is what he's talking about.	
[2]	what you mean by – what you're asking.		[2]	MS. JORDAN: I have a copy of the	
[3]	ATTENDEE: You're looking at this from		[3]	remedial investigation. I can show you where	
[4]	the air, from an airplane and you can see that		[4]	that is.	
[5]	it's flowing that way, but there's probably		[5]	ATTENDEE: Just for curiosity.	
[6]	something going on that we're not seeing on the		[6]	CAPTAIN ROBERTS: We can answer that.	
[7]	other side all the way around and I'm asking how		[7]	MS. PARKER: Can you go back to the	
[8]	far that extends.		[8]	slide that was just up there? The last slide	
[9]	See, if that doesn't extend off the base		[9]	before Linnea Eng came up. Just one highlight	
[10]	and, you know that, then, it's a nonissue for the		[10]	that I thought should definitely be mentioned	
[11]	community. But if it does extend off the base		[11]	here. The last thing is what we're doing with	
[12]	into the groundwater, there are people that are		[12]	this site, which I think is a highlight.	
[13]	drinking that.		[13]	It's basically a highlight for the base	
[14]	MS ENG: No, the closest thing we are		[14]	and for the citizens of the community, is the	
[15]	talking about any contaminated water that's		[15]	recreational reuse that we plan on doing with	
[16]	coming from the area of this landfill is		[16]	this site. By using this alternative, we're	
[17]	discharging immediately into the river and if we		[17]	going to be able to provide back to this area	
[18]	could look at the - he's going to show us -		[18]	what was there before: The fishing, the hunting,	
[19]	ATTENDEE: It doesn't contaminate the		[19]	the environmental trials that we had in there.	
[20]	direction of the perimeter of the base?		[20]	I think that's the main benefit of this	
[21]	MS. ENG: It absolutely does not.		[21]	whole remedy that we have. By having the	
[22]	ATTENDEE: That's the question I'm		[22]	vegetative soil cover, we're going to - you're	

SITE 12, LANDFILL BEHIND RIFLE RANGE

		Page 41			Page 43
[1]	going to be able to have the beneficial use of		[1]	remediated.	
[2]	this site back again once we get the remedial		[2]	ATTENDEE: Can I ask a question about	
[3]	action actually into place, once we start		[3]	Alternative 2?	
[4]	actually getting this going.		[4]	MS. PARKER: Okay.	
[5]	So, I think that is key and I think it's		[5]	ATTENDEE: The question I'm not clear on –	
[6]	the highlight of this whole thing, actually to be		[6]	I did try to read this before I came here.	
[7]	able to come back full circle and get back to		[7]	I have very short exposure to this. On	
[8]	where - I mean, that's basically what the -		[8]	Alternative 2, I think what you said or what this	
[9]	what environmental remediation is all about.		[9]	says is that there would be some soil removed.	
[10]	You're supposed to be able to provide a level of		[10]	Right?	
[11]	life that you were initially used to, to		[11]	MS. JORDAN: There's going to be some	
[12]	be able to get that back again. So, I think		[12]	debris removed from Area C.	
[13]	that's what the benefit of this whole thing is to		[13]	MS. PARKER: Just area C.	
[14]	be able to – once we complete this project,		[14]	ATTENDEE: What is defined debris? Is that	
[15]	you'll be able to see what was there before.		[15]	contaminated?	
[16]	The only thing I wanted to mention, if we did		[16]	MS. PARKER: Yes.	
[17]	actually have the alternative where we had		[17]	ATTENDEE: So, that is contaminated soil,	
[18]	the actual liner and the cap, there might be some		[18]	which would be the major concern?	
[19]	restrictions or some slight restrictions that		[19]	MS. PARKER: Right. And that will be	
[20]	might be involved as far as maybe hunting. You'd		[20]	disposed of only in area C.	
[21]	have to be kind of careful with the cap.		[21]	ATTENDEE: Okay. But if you do Alternative	
[22]	The cap has a lot of different factors		[22]	3, that would not be done, but the	
		Page 42			Page 44
£11	shot have to be accorded and different actions that		[1]	hottom month he lived To that what I	
[1]	that have to be considered and different options that		[1]	bottom would be lined. Is that what I	
[2]	would have to definitely be considered. So, that's		[2]	understand?	
[3]	why we think that Alternative 2 would be the best		[3]	MS. JORDAN: We still have to do some	
[4]	way to actually go here.		[4]	removal from Area C even if we put on the liner.	
[5]	And then we have the schedule. You-all probably		[5]	MS. PARKER: Yes. The only difference	
[6]	want to know how soon we can be doing all this		[6]	there with Alternative 3 is just putting a liner.	
[7]	work, get everything going. As you know right now, we're in the middle of public comment period. It		[7]	We'd be doing the same excavation from Area C,	
[8] [9]	started November 1st and goes to the end of this		[8]	from the same area. ATTENDEE: Some material will be being	
			[9]	_	
[10]	month, the 30th. The public meeting is tonight,		[10]	returned in 3 to the surface, right?	
[11]	November 9 th . Our plan is to award the remedial action contract		[11] [12]	MS. PARKER: Yes. ATTENDEE: But you will dispose of all	
[12] [13]	on December 14th, if we don't have any substantial		[13]	of the site contaminated soil there?	
[14]	comments that have to be addressed. We plan also		[14]	MS. PARKER: That's contaminated soil	
[15]	to have the Record of Decision signed hopefully on		[15]	that we're going to actually remove.	
				ATTENDEE: You think with the liner you	
[16] [17]	February 14. The Record of Decision basically outlines what		[16] [17]	wouldn't have to remove it? You would just keep	
	•				
[18]	the alternative was and it provides a signature by		[18]	it here, but move it to below the liner? MS PAPKEP: Well actually	
[19]	both the Navy and by EPA where we both agree on		[19]	MS. PARKER: Well, actually –	
[20]	the remedy that's going to – that has been selected		[20] [21]	ATTENDEE: Well, the liner goes down to	
[21] [22]	and we agree on what we're going to actually be doing to get this site		[21]	the bottom and the cap goes on the top, right? MS. PARKER: The liner goes over – goes	
[44]	doing to get this site		[44]	MIG. I ARREA. THE HHEI GOES OVEL - GOES	

	Page 45			Page 47
[1]	over top of the trash.	[1]	water levels generated by the Patuxent?	
[2]	ATTENDEE: So, there's nothing on the	[2]	MS. PARKER: Well, that's what we're	
[3]	bottom?	[3]	saying. We don't - that's why we're not	
[4]	MS. PARKER: No, the liner is just	[4]	- that's why they don't want to go with the liner.	
[5]	basically underneath the vegetative soil cover.	[5]	We're basically saying that we don't see a real	
[6]	So, it's – we're going to have the liner. So	[6]	benefit by using that liner because the control	
[7]	it's –	[7]	is not the infiltration. The control is the	
[8]	ATTENDEE: How does the liner differ	[8]	water level, which is dictated by Pax River.	
[9]	from the cap?	[9]	It's not by the infiltration. That's not what's	
[10]	MS. PARKER: Well, a liner is	[10]	driving everything.	
[11]	geosynthetic type fabric. So, it's like	[11]	So, it kind of seems like you're paying	
[12]	membranes –	[12]	the cost, you're paying an extra \$4 million and	
[13]	ATTENDEE: And the cap is just dirt?	[13]	it doesn't seem like you're actually getting that	
[14]	MS. PARKER: That is the cap.	[14]	much benefit by having a liner. That was when	
[15]	MS. JORDAN: The cover is what you call	[15]	the assessment was –	
[16]	the soil. The cap would be the liner.	[16]	ATTENDEE: How deep is the smallest	
[17]	ATTENDEE: So, the liner and the cap are	[17]	stuff actually buried in the water? Was the	
[18]	the same?	[18]	stuff fully submerged or partially submerged	
[19]	MS. PARKER: Pretty much, except you're	[19]	or –	
[20]	getting more cover with that.	[20]	MS. PARKER: The trash that was actually	
[21]	MR. UNDERWOOD: Just a clarification.	[21]	there? Part of it was actually submerged, wasn't	
[22]	The Area C cap or cover would be very similar to	[22]	it?	
	D 46			D 40
	Page 46			Page 48
[1]	the Type II cover except it's got a membrane in	[1]	MS. JORDAN: Actually, in the wetland a	Page 48
[1] [2]	-	[1] [2]	MS. JORDAN: Actually, in the wetland a lot of the area was a prior wetland, which was	Page 48
	the Type II cover except it's got a membrane in			Page 48
[2]	the Type II cover except it's got a membrane in it and an impervious layer and that membrane is	[2]	lot of the area was a prior wetland, which was	Page 48
[2] [3]	the Type II cover except it's got a membrane in it and an impervious layer and that membrane is the impervious layer. It would minimize	[2] [3]	lot of the area was a prior wetland, which was just filled in. It was just common practice back	Page 48
[2] [3] [4]	the Type II cover except it's got a membrane in it and an impervious layer and that membrane is the impervious layer. It would minimize infiltration. The remainder of it, other than	[2] [3] [4]	lot of the area was a prior wetland, which was just filled in. It was just common practice back then to just put trash in the wetland. We	Page 48
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	P	age 49			Page 51
[1]	what the following one will be with OU-2, which		[1]	seconds and the only thing I see as the saving	
[2]	will be actually trying to select a site and see		[2]	grace of this is that you're going to check every	
[3]	where we're going to actually replace those		[3]	five years to see if Mother Nature didn't reject	
[4]	wetlands.		[4]	your wetlands, at which point I'm not sure we	
[5]	CAPTAIN ROBERTS: A little more in-depth		[5]	know enough to do that yet. But we'll discuss	
[6]	on that. Our in natural resources people have		[6]	that I think in context later.	
[7]	done several studies, looked at where they would		[7]	MS. JORDAN: Well, the natural	
[8]	like to put wetlands or if we're ever in a		[8]	resources - Kyle is here - but they already	
[9]	situation where we had to replace in like		[9]	have areas in here. Some are already wetlands to	
[10]	wetland, they already have several areas that		[10]	look at, can we enhance these areas and make	
[11]	they've studied and looked at where they would		[11]	them more in that recovering of the landfill site?	
[12]	want to do it.		[12]	ATTENDEE: Well, I can see enhance.	
[13]	The only thing left in this part is		[13]	That's not making new.	
[14]	which one do we select? He's got several of them		[14]	MS. JORDAN: We are going to have to	
[15]	that he would like to put in wetlands there, but		[15]	create some new ones.	
[16]	we haven't selected the one yet.		[16]	MS. ENG: The wetlands we are talking	
[17]	MS. JORDAN: We did look at trying to		[17]	about is primarily different types of reeds that	
[18]	put the wetlands back on-site, but the topography		[18]	sprung up on top of the landfill itself. So,	
[19]	wasn't going to work out with us that we were		[19]	we're not talking about billions of years. We're	
[20]	going to have to recharge and keep it pliable.		[20]	talking about 30 years of growth on top in sort	
[21]	So, then we began looking at places off-site.		[21]	of low spots on top.	
[22]	ATTENDEE: It would still be on base		[22]	ATTENDEE: Okay.	
	p	age 50			Dogo 52
	•	uge 50			Page 52
[1]		uge 30	[1]	MS. PARKER: And one thing that you	rage 32
[1] [2]	though?	age 50	[1] [2]	MS. PARKER: And one thing that you maybe mentioned when you were talking about	rage 32
[2]	though? MS. JORDAN: It would still be on base,	ugo 50	[2]	maybe mentioned when you were talking about	rage 32
[2] [3]	though?	ago 50	[2] [3]	maybe mentioned when you were talking about monitoring for the landfill – I mean for the	rage 32
[2] [3] [4]	though? MS. JORDAN: It would still be on base, just away from the site. MS. PARKER: That will be the next	age 50	[2] [3] [4]	maybe mentioned when you were talking about monitoring for the landfill – I mean for the actual wetlands – that we are going to be doing	rage 32
[2] [3]	though? MS. JORDAN: It would still be on base, just away from the site.	age 50	[2] [3]	maybe mentioned when you were talking about monitoring for the landfill – I mean for the actual wetlands – that we are going to be doing continuous long-term monitoring. So, that we	rage 32
[2] [3] [4] [5]	though? MS. JORDAN: It would still be on base, just away from the site. MS. PARKER: That will be the next follow-on to this. We will be actually addressing that. So, see, we don't really have a	age 50	[2] [3] [4] [5] [6]	maybe mentioned when you were talking about monitoring for the landfill – I mean for the actual wetlands – that we are going to be doing continuous long-term monitoring. So, that we will – if we get significant increases in any of	rage 32
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		Page 53			Page 55
[1]	plan. We have all that available.		[1]	So you know the build up there. It's a beautiful	
[2]	I Also just wanted to let you know that		[2]	spot right now.	
[3]	you can send any comments that you have based on		[3]	We get this cleaned up, recontoured so	
[4]	the proposed plan and this presentation tonight		[4]	that we can have that 2 percent for the surface	
[5]	to Ms. Joan Hinson, who is here this evening.		[5]	water and I think it's going to - we are going	
[6]	She's from the commanding officer's group and our		[6]	revegetate it. It's going to have the potential	
[7]	environmental support group. This is the address		[7]	to be a really beautiful place that the people	
[8]	here. So you can –		[8]	can enjoy and use.	
[9]	ATTENDEE: Does she have an e-mail		[9]	So, we're doing what we have to do to	
[10]	address?		[10]	clean it up. We're going to reuse it and I think	
[11]	MS. PARKER: Yes. That's listed in the		[11]	it's one of the better reuse projects in the Navy	
[12]	proposed plan. She was gracious to help set up		[12]	right now. I mean, I already show this as reuse	
[13]	all the audiovisual and the actual getting the		[13]	in what we've done with the beach and this is	
[14]	sound effects here. We appreciate that. But		[14]	really going to be a great project.	
[15]	that's pretty much it for the evening. If		[15]	I'm really looking forward to it, to	
[16]	there's any more questions, we can address them		[16]	take the piece of property that wasn't used in	
[17]	now or after. Captain?		[17]	the way it was in the past and turn it into	
[18]	CAPTAIN ROBERTS: Well, I think you can		[18]	something that's cleaned up and reusable and is	
[19]	see that it does really meet the requirements of		[19]	esthetically pleasing.	
[20]	what we want to do to clean that up, to protect		[20]	This is why I've been so excited about	
[21]	it and to protect the human and ecological		[21]	this project for so many years since I've been	
[22]	receptors and to do what we should do to make		[22]	here is because of the potential for the reuse	
		Page 54			Page 56
		Page 54			Page 56
[1]	that land accessible. Right now it's not.	Page 54	[1]	and it really is a beautiful site and it ought to	Page 56
[2]	It's probably the most cost-effective	Page 54	[2]	be shared with everybody when we get it open.	Page 56
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[1]	the project in the spring. I think the major		
[2]	cover area, moving the land and contouring and		
[3]	everything is about a ten-month issue isn't it?		
[4]	MS. JORDAN: Right. That's why we're		
[5]	going to try to get out there in the spring and		
[6]	get it done in one season.		
[7]	CAPTAIN ROBERTS: Okay. Well, thank you		
[8]	very much for being here. I appreciate your		
[9]	questions and comments. I'm pleased that you		
[10]	were here.		
[11]	(Whereupon, the public meeting was		
[12]	concluded.)		
[13]			
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Lawyer's Notes

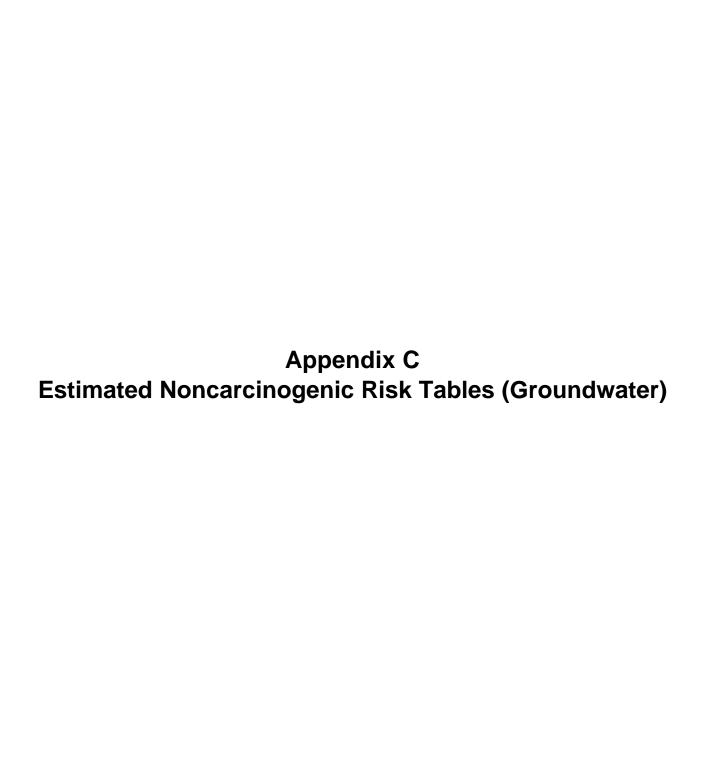


Table C-1

Estimated Noncarcinogenic Risk

Groundwater Ingestion

Future Child and Adult Resident Scenario

NAS Patuxent River Fishing Point Landfill (Sites 1 and 12)

	Oral	Exposure		Child Adult					
	Reference	Point	Estimated Daily	Hazard		Estimated Daily	Hazard		Percent
Chemical	Dose (RfD)	Concentration	Intake (DI)	Quotient	HQ>1?	Intake (DI)	Quotient	HQ>1?	of Total
	(mg/kg-day)	(Fg/I)	(mg/kg-day)	(DI/RfD)		(mg/kg-day)	(DI/RfD)		Risk
Volatiles									
1,2-Dichloroethane	3.0E-02	6.0E-01	3.8E-05	1.3E-03	NO	1.6E-05	5.5E-04	NO	0.02%
Inorganics									
Antimony	4.0E-04	7.7E-+00	4.9E-04	1.2E+00	YES	2.1E-04	5.3E-01	NO	15.24%
Barium	7.0E-02	3.1E+02	2.0E-02	2.8E-01	NO	8.4E-03	1.2E-01	NO	3.47%
Cadmium	5.0E-04	1.4E+01	8.9E-04	1.8E+00	YES	3.8E-04	7.7E-01	NO	22.17%
Chromium	5.0E-03	1.0E+01	6.4E-04	1.3E-01	NO	2.7E-04	5.5E-02	NO	1.58%
Manganese	2.4E-02	1.6E+03	1.0E-01	4.3E+00	YES	4.4E-02	1.8E+00	YES	53.12%
Nickel	2.0E-02	1.1E+02	7.1E-03	3.5E-01	NO	3.0E-03	1.5E-01	NO	4.39%
HAZARD INDEX (Sum of DI/RfD) 8.1E+00 3.5E+00 100								100%	

Calculation:			
Daily In	take =	Conc * IngR * EF * ED	_
(mg/kg-	day)	BW * AT * 365 days/year * 1000 Fg/mg	-
EXPOSURE ASSUMPTIONS			
Exposure Setting		Future Resid	dential
Exposure Case		Child	Adult
IngR - Ingestion Rate (liters/da	ıy)	1	2
BW - Body Weight (kilograms)		15	70
EF - Exposure Frequency (day	s/year)	350	350
ED - Exposure Duration (years	s)	6	24
AT - Averaging Time (years)		6	24

Table C-2

Estimated Noncarcinogenic Risk

Groundwater Ingestion

Current and Future Site Worker Scenarios

NAS Patuxent River Fishing Point Landfill (Sites 1 and 12)

	Oral	Exposure				
	Reference	Point	Estimated Daily	Hazard		Percent
Chemical	Dose (RfD)	Concentration	Intake (DI)	Quotient	HQ>1?	Of Total
	(mg/kg-day)	(F g/I)	(mg/kg-day)	(DI/RfD)		Risk
Volatiles	•					
1,2-Dichloroethene	3.0E-02	6.0E-01	1.2E-05	3.9E-04	NO	0.02%
Inorganics			<u>. </u>			
Antimony	4.0E-04	7.7E+00	1.5E-04	3.8E-01	NO	15.24%
Barium	7.0E-02	3.1E+01	6.0E-03	8.6E-02	NO	3.47%
Cadmium	5.0E-04	1.4E+01	2.7E-04	5.5E-01	NO	22.17%
Chromium	5.0E-03	1.0E+01	2.0E-04	3.9E-02	NO	1.58%
Manganese	2.4E-02	1.6E+03	3.2E-02	1.3E+00	YES	53.12%
Nickel	2.0E-02	1.1E+02	2.2E-03	1.1E-01	NO	4.39%
Thallium	8.0E-05	2.0E+00	3.9E-05	4.9E-01	NO	19.85%
HAZARD INDEX (sum of	DI/RfD)			2.5E+00		100%

Calculation:

Daily Intake = Conc * IngR * EF * ED

(mg/kg-day) BW * AT * 365 days/year * 1000 F g/mg

EXPOSURE ASSUMPTIONS	
Exposure Setting	Current and Future Scenarios
Exposure Case	Site Worker
IngR - Ingestion Rate (liters/day)	2
BW - Body Weight (kilograms)	70
EF - Exposure Frequency (days/year)	250
ED - Exposure Duration (years)	25
AT - Averaging Time (years)	25

Appendix D Table of ARARs

			Table D-1				
Federal Location-Specific ARARs Record of Decision for Sites I and 12, Patuxent River Naval Air Station							
Location	Requirement	Prerequisite for ARAR to apply	Citation	ARAR Determination	Comments		
National Archaeological a	I and Historical Preservation Act		1				
Within area where action may cause irreprable harm, loss, or destruction of significant artifacts	Construction on previously undisturbed land would require an archaeological survey of the area.	Alteration of terrain that threatens significant scientific, prehistoric historic, or archaeological data.	Substantive requirements of 36 CFR 65; 16 USC 469	Relevant and Appropriate	Although construction at Site 1 or Site 12 will not occur on previously undisturbed land, the requirements of this regulation are relevant and appropriate for response action that can impact the archaeological site adjacent to Site 1.		
Historic Sites, Buildings,	and Antiquities Act						
Historic sites	Avoid undesirable impacts on landmarks	Areas designated as historic sites.	16 USC 461; 40 CFR 6.301	Relevant and Appropriate	Although none of the historical structures on the Patuxent River NAS are of undisturbed land, the requirements of this regulation are relevant and appropriate in situations where remedial actions may adversely affect the historical structures located on the NAS.		
Endangered Species Act of	of 1973						
Critical habitat upon which endangered species or threatened species depend	Requirement to conserve endangered species or threatened species, including consultation with the Department of the Interior. Reasonable migration and enhancement measures must be taken, including live propagation, transplantation and habitat acquisition and improvement	Determination of effect upon endangered or threatened species or its habitat by conducting biological assessments.	16 USC 1531; 16 USC 1536(a)	Applicable	There is a federally threatened animal species (Northeastern Tiger Beetle) in the vicinity of Sites 1 and 12. If remediation activities could impact this species consultation with the Department of the Interior is required to determine the appropriate action.		
Migratory Bird Treaty Act	of 1972						
Migratory bird area	Protects almost all species of native birds in the U.S. from unregulated taking which can include poisoning at hazardous waste sites	Presence of migratory birds.	16 USC Section 703	Applicable	Migratory birds are encountered at Site 1 and Site 12. These requirements are applicable to any response actions that could results in unregulated "taking" of native birds		
Marine Mammal Protectio	n Act						
Marine mammal area	Protects any marine mammal in the U.S. except as provided by international treaties from unregulated taking	Presence of marine mammals.	16 USC 1372(2)	Applicable	Marine mammals are present in the Patuxent River. Erosion and sediment control and stormwater management measures will be taken to protect marine mammals. Response actions will not involve unregulated "taking".		
Fish and Wildlife Coordin	nation Act, Fish and Wildlife Improvement Act of 1978, F	Fish and Wildlife Conservation Act of 1980					
Area affecting stream or other water body	Provides protection for actions that would affect streams, wetlands, other water bodies or protected habitats. Any action taken should protect fish or wildlife	Diversion, channeling or other activity that modifies a stream or other water body and affects fish or wildlife.	16 USC 661; 16 USC 662; 16 USC 742a; 16 USC 2901; 50 CFR 83	Applicable	Response actions, such as shoreline stabilization and soil cover installation will incorporate protection for any area water body, wetlands, or protected habitats.		
Procedures for Implemen	nting the Requirements of the Council on Environmenta	I Quality on the National Environmental Policy	y Act and Executive Ord	der 11990, Protection of Wetla	ands		
Wetland	Requirement to minimize the destruction, loss, of degradation of wetlands. Wetlands of primary ecological significance must not be altered so that ecological systems in the wetlands are unreasonably disturbed	Wetlands as defined by Executive Order 11990 Section 7.	40 CFR 6, Appendix A excluding Sections 6(a)(2), 6(a)(4), 6(a)(6), 40 CFR 6.302	Applicable	Wetlands are present in the vicinity of Site 1 and Site 12. Remedial activities such as soil cover installation, must minimize the destruction, loss of degradation of the wetlands		
Clean Water Act, Section	404						
Wetland	Dredged or fill material must not be discharged to navigable waters if the activity; contributes to the violation of Maryland water quality standards; jeopardizes endangered or threatened species; or violates requirements of the Title III of the Marine Protection, Research and Sanctuaries Act of 1972.	Wetland as defined by Executive Order 11990 Section 7.	40 CFR 230.10; 40 CFR 230.41; 40 CFR 230.70- 230.77; 40 CFR 230.60- 230.61	Applicable	Wetlands and navigable waters (Patuxent River) are present in the vicinity of Site 1 and Site 12. Remedial activities, such as soil cover installation will comply with the requirements of these regulations		
Wild and Scenic Rivers A	ct						
Within area affecting national wild, scenic, or recreational rivers	Avoid taking or assisting in action that will have direct adverse effect on national, wild or scenic recreational rivers	Activities that affect or may affect any of the rivers specified in Section 1274 and 1276(a)	16 USC 1271-1276; 36 CFR 297; 40 CR 6 302 (e)	Relevant and Appropriate	The Patuxent River is not a national wild, scenic, or recreational river. 1 is a State designated scenic river, however. The requirements of this regulation are relevant and appropriate to the shoreline stabilization activities at Site 1 and Site 12		

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Table D-1 Federal Location-Specific ARARs Record of Decision for Sites I and 12, Patuxent River Naval Air Station								
Location	Requirement	Prerequisite for ARAR to apply	Citation	ARAR Determination	Comments			
Magnuson Fishery Conse	rvation and Management Act							
Managed Fisheries	Provided for conservation and management of specified fisheries within specified fishery conservation zones (in federal waters)	Presence of managed fisheries in federal waters.	16 USC 1801	Relevant and Appropriate	The Patuxent River is a fishery (occurrence of harvesting, and recreational and commercial fishing). The Patuxent River is under State jurisdiction, however. The requirements of this regulation are relevant and appropriate for installation of the soil cover (e.g. erosion and sediment control and stormwater management).			
Resource Conservation a	nd Recovery Act (RWCA)							
Within 100-year floodplain	Facility must be designed, constructed, operated, and maintained to aviod washout	RCRA hazardous waste; treatment, storage, or disposal of hazardous waste	40 CR 264.18 (b)	Relevant and appropriate	Portions of Sites 1 and Site 12 are located in a 100-year floodplain. Therefore the requirements of this regulation are relevant and appropriate to installation of the soil cover over the landfill. In addition, wetlands that are destroyed will be mitigated			
Executive Order No. 1198	8, Protection of Floodplains							
Within floodplain	Actions taken should avoid adverse effects minimize potential harm, restore and preserve natural and beneficial values, including wetlands.	Action that will occur in a floodplain, i.e., lowlands, and relatively flat areas adjoining inland and coastal waters and other floodprone areas.	40 CFR 6, Appendix A; excluding Sections 6(a)(2), 6(a)(4), 6(a)(6); 40 CFR 6.302	Relevant and Appropriate	Portions of Sites 1 and Site 12 are located in a 100-year floodplain. Therefore the requirements of this regulation are relevant and appropriate to installation of the soil cover over the landfill. In addition, wetlands that are destroyed will be mitigated			
Executive Order No. 60 FI	FR No. 154, 8/10/95							
Enviromentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds	Establishes guidelines to assist federal agencies in the implementation of enviromentally and economically beneficial landscape practices	Landscaping on federal grounds	60 FR No. 154	To-be-considered	Native drought-tolerant species will be used to cover the landfills in furtherance of Executive Order No. 60 FR No. 154			

Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes are policies does not indicate that DON accepts the entire statutes or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading only substantive requirements of the specific citations are considered potential ARARs.

ARARs - Applicable or relevant and appropriate requirements

RCRA - Resource Conservation and Recovery Act

CFR - Code of Federal Regulations

CWA - Clean Water Act DON - Department of the Navy EO - Executive Order FR - Federal Register

HWCA - Hazardous Waste Control Act

NAS - Naval Air Station USC - United States Code

TBC - To Be Considered

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Table D-2									
	Federal Location-Specific ARARs								
		Record of Decision for Sites	I and 12, Patuxent Ri	iver Naval Air Station					
Location	Requirement	Prerequisite for ARAR to apply	Citation	ARAR Determination	Comments				
Threatened and Endange	red Species								
Critical habitat upon which endangered species or threatened species depend	Requires action to conserve endangered or threatened species and the critical habitats they depend on. May not reduce the likelihood of either the survival or recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of a listed species of otherwise adversely affect the species.	Determination of effect upon endangered or threatened species or its habitat	COMAR 08.03.08	Applicable	There is one state-designated endangered plant species. (Fall Witchgrass) that has been identified in the landfill footprint, as well as other areas of the NAS. These regulations are applicable to the installation of the soil cover, which may jeopardize this plant species				
Threatened and Endange	red Fish Species								
Critical habitat upon which endangered or threatened fish species depend	Requires action to conserve endangered or threatened fish species and the critical habitats they depend on.	Determination of effect upon endangered or threatened fish species or its habitat	COMAR 08.02.12	Applicable	The endangered and threatened fish species identified at the station are situated in the open bay. These regulations are applicable if remedial actions, such as installation of the soil cover, jeopardizes endangered or threatened fish species.				
Nontidal Wetlands Prote	ction Act, Maryland Nontidal Wetlands Regulations								
Wetland	Provides regulations for activities on or near nontidal wetlands (an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions). Regulations include avoiding wetlands degradation occur as a result of permitted human activity, these loses or degradations should be offset wherever practicable and feasible	Activities that will occur on or near nontidal wetlands	COMAR 05.09.5-902	Applicable	Nontidal wetlands are present in the vicinity of Site 1 and Site 12. The substantive requirements of these regulations must be met for installation of the soil cover over the wetlands				
Wetlands and Riparian R	lights								
Wetlands	Requirements to preserve wetlands and prevent their destruction; requires a license for dredging or filling of wetlands	Activities that affect the integrity of wetlands, such as dredging or filling	COMAR 16.02. 16202	Applicable	Nontidal wetlands are present in the vicinity of Site 1 and Site 12. The substantive requirements of this regulation are applicable for the response actions that may affect the integrity of these wetlands				
Water Management									
Water resources of the State	Provides for the conservation and protection of the water resources of the State by requiring that any land-clearing grading, or other earth disturbances require an erosion and sediment control plan. Also provides that stormwater must be managed to prevent off-site sedimentation and maintain current site conditions	Activities that affect the water resources of the State	COMAR 04.01 4-101 COMAR 04.01 4-103 COMAR 04.01 4-205 COMAR 04.01 4-206	Applicable	The design for the soil cover installation will incorporate the requirements of this regulation (e.g erosion and sediment control and stormwater management)				
policies does not indicate th only substantive requiremen	eir citations, are provided as headings to identify general cate at DON accepts the entire statutes or policies as potential AR its of the specific citations are considered potential ARARs.								

DON - Department of the Navy

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Table D-3 Federal Action-Specific ARARs

Record of Decision for Sites 1 and 12, Patuxent River Naval Air Station

All Action-Specific ARARs are covered by State of Maryland regulations (see Table D-4).

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	Table D-4								
	Federal Location-Specific ARARs Record of Decision for Sites I and 12, Patuxent River Naval Air Station								
Action	Requirement	Prerequisite for ARAR to apply	Citation	ARAR Determination	Comments				
Maryland Hazardous Waste Regulations									
Storage, treatment or disposal, and transportation of hazardous waste	Regulations and procedures for the identifications, listings, transportation, treatment, storage and disposal of hazardous waste must be met	Handling of hazardous wastes.	COMAR 26.13.02, COMAR 26.13.04, Annotated Code of Maryland Title 7	Applicable	Any hazardous waste found during site remediation will be disposed of according to regulations.				
Solid Waste and Wate	r Supply Regulations								
Landfill Closure	Proper closure and post closure monitoring and maintenance of landfills that is protective of the health, welfare, and property of the people of the State of Maryland is required. Specifications for sanitary landfill closure, vegetative stabilization, and gas venting are provided.	Closure and post closure of sanity landfill in the State of Maryland.	COMAR 26.04.07.21 COMAR 26.04.07.22	Relevant and Appropriate	The landfill ceased operation prior to promulgation of Maryland solid waste regulations, but landfill contents are similar to those covered under this regulation. Requirements are relevant and appropriate, with a variance as granted by the State.				
Solid Waste and Wate	r Supply Regulations - Variances								
Landfill Closure	A variance from one or more provisions of the solid waste regulations.	A variance can be granted by the State when the design or method of operation proposed in the variance application is to the satisfaction of the State to conserve and protect public health, the natural resources, and the environment of the State, and to control air, water, and land pollution to at least the same extent as would be obtained by compliance with the regulation.	COMAR 26.04.07.26	Applicable	A variance has been granted by the State for construction of a soil cover over the Sites 1 and 12 landfill.				
Stormwater Managem	ent								
Design and construction	Regulations require the design and construction of a system necessary to control stormwater.	Design and construction	COMAR 26.17.02 COMAR 26.17.02.01 COMAR 26.17.02.03(A&B) COMAR 26.17.02.05 (A) COMAR 26.17.02.06 COMAR 26.17.02.08 COMAR 26.17.02.10	Applicable	The remedial action will not incorporate measures to control and manage stormwater.				
Erosion and Sedimen	Control								
Land clearing, grading, and earth disturbances	Regulations require the preparation and implementation of a plan to control erosion and sediment for activities involving land clearing, and grading and earth disturbances. Erosion and sediment control criteria are also established.	Land clearing, grading, and earth disturbances	COMAR 26.17.01 COMAR 26.17.01.04 COMAR 26.17.01.05 COMAR 26.17.01.07 COMAR 26.17.01.08 COMAR 26.17.01.09 COMAR 26.17.01.11	Applicable	The remedial action will incorporate the standards required for clearing, grading, and other earth disturbances, including compliance with County and Municipal erosion and sediment control ordinances, and the Commission's erosion and sediment control regulations.				
Oil Pollution and Tank	Management								
Disposal of oil or other matter containing oil	Provides that oil or other matter containing oil may not be discharged, dumped, spilled, drained, thrown, or deposited into, near, or in an area likely to pollute the waters of the State (surface and underground waters within the boundaries of the State, including the Chesapeake Bay and its tributaries, and all ponds, lakes, rivers, streams, public ditches, and public drainage systems within the State other than those designed to collect, convey, or dispose of the sanitary sewer).	Disposal of oil or other matter containing oil.	COMAR 26.10.01.02, Annotated Code of Maryland Title 5	Applicable	The requirements of this regulation will be followed as part of the response action if contractors handle fuel oil or other lubricants onsite.				
Air Quality									
Air Emissions	Provide State-adopted, National Ambient Air Quality Standards and Guidelines.	Action that will affect air quality standards.	COMAR 26.11.04	Applicable	Applicable to construction activities relating to the remedial actions.				
Visible air emissions	Provides Emission Standards for Visible Air	Action resulting in visible air emissions.	COMAR 26.11.06.02 (C.3)	Applicable	Applicable to materials handling or construction activities.				

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Emissions.

Table D-4 Federal Location-Specific ARARs Record of Decision for Sites I and 12, Patuxent River Naval Air Station Prerequisite for ARAR to apply Citation ARAR Determination Comments Action that will result in the emission of particulates. Action causing a nuisance, or air pollution. COMAR 26.11.06.08 Applicable Applicable to dust emissions during construction. Applicable to dust emissions during construction.

Applicable to construction activities relating to the remedial actions.

Applicable

Occupational Industrial and Basidantial Haranda

Occupational, Indus	trial, and Residential Hazards				
Action that will generate noise Action that will generate noise (continued)	Limits set on the levels of noise must be met; these limits are protective of the health, welfare, and property of the people in the State of Maryland. The maximum permitted levels for construction activities may not exceed 90 dBA during the day and 75 dBA during night.	Action that will generate noise.	COMAR 26.02.03.02A (2) and B(2), COMAR 26.02.03.02.03A, Annotated Code of Maryland Title 3	Applicable	During the site remediation work, the maximum allowable noise levels will not be exceeded at the Site 1 and Site 12 boundaries.

COMAR 26.11.06.09

Statutes and polices, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that DON accepts the entire statutes or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

pollution.

Action causing odors, nuisance, or air

ARARs - Applicable or relevant and appropriate requirements

pollution is created.

Requirement

Provides General Emission Standards, Prohibitions,

May not cause or permit the discharge into the

atmosphere of gases, vapors, or odors beyond the

property line in such a manner that a nuisance on air

and Restrictions for particulates.

Prohibits nuisance or air pollution.

DON - Department of the Navy

Action

Particulate air

Nuisance Control

emissions

Odor Control

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Appendix E Detailed Cost Estimate of the Selected Remedy

Patuxent River Naval Air Station, Sites 1 & 12 Feasibility Study

<u>Alternative 2</u> - Institutional Controls and Long-term Monitoring; Installation of a Soil Cover over Areas B, and D; Excavation of Debris and Contaminated Sediment from Area C; and Off-Site Disposal

·					
Cost Component	Estimated Quantity	Unit		Unit Cost	Capital Cost
1. Cap Materials (Areas B & D)	Quantity	- Oilit		000.	0001
1. Hydroseeding	1,111	MSF	\$	49.00	\$ 54,443
2. 6-inch Topsoil/Plantable Soil (Del./Dump)	23,341	CY	\$	8.65	\$ 201,900
3. Topsoil backfill, w/dozer, 200hp	23,341	CY	\$	0.81	\$ 18,906
4. Controlled Fill					
Excavate/Haul/Dump	214,612	CY	\$	3.10	\$ 665,297
Backfill controlled fill, w/dozer, 200hp	214,612	CY	\$	0.81	\$ 173,836
Compact controlled fill	214,612	CY	\$	0.41	\$ 87,991
5. Clearing (Areas B,D, and F)	11	AC	\$	3,489.00	\$ 36,844
6. Testing					
Geotechnical	6	EA	\$	200.00	\$ 1,200
Nuclear Density Gage Rental	64	DAY	\$	100,00	\$ 6,400
Sampling technician	64	DAY	\$	210.00	\$ 13,400
7. Perforated 4-inch Corrugated Plastic Pipe (CPP)	6,036	LF	\$	0.99	\$ 5,976
8. Smooth 4-inch CPP	604	LF	\$	0.99	\$ 598
9. 4-inch CPP Tee	60	EA	\$	14.05	\$ 848
10. Underdrain Stone (Del./Dump)	447	CY	\$	10.00	\$ 4,471
Subtotal					\$ 1,272,150
II. Top of Slope Diversions					
1. Controlled Fill	4,471	CY	\$	3.10	\$ 13,861
Backfill, w/dozer, 200 hp	4,471	CY	\$	0.81	\$ 3,622
Compact	4,471	CY	\$	0.41	\$ 1,833
Subtotal					19,316
III. Riprap Downchutes 1. Non-Woven Geotextile	3,169	SF	\$	0.14	\$ 444
2. Riprap	176	CY	\$	29.50	\$ 5,194
3.Filter Stone (for vehicle access)	59	CY	\$	10.00	\$ 587
Subtotal					6,224
IV. Drainage Channels 1. Excavate site soil for channel	3,577	CY	\$	1.35	\$ 4,829
Controlled fill	3,577	CY	\$	3.10	\$ 11,089
Backfill controlled fill, w/dozer, 200 hp	3,577	CY	\$	0.81	\$ 2,897
Compact controlled fill	3,577	CY	\$	0.41	\$ 1,467
2. Riprap	4,695	CY	\$	29.50	\$ 138,500
3. Filter Stone	1,565	CY	\$	10.00	\$ 15,650
4. Non-Woven Geotextile	84,508	SF	\$	0.14	\$ 11,831
Subtotal	04,000	OI .	Ψ	0.14	186,262
V. Erosion and Sediment Control			+		100,202
Sediment Traps	6	EA	\$	3,000.00	\$ 18,000
2. Temporary Vegetation	7	AC	\$	3,000.00	
3. Silt Fence	6,036	LF	\$	1.42	\$ 8,572

Patuxent River Naval Air Station, Sites 1 & 12 Feasibility Study

<u>Alternative 2</u>- Institutional Controls and Long-term Monitoring; Installation of a Soil Cover over Areas B, and D; Excavation of Debris and Contaminated Sediment from Area C; and Off-Site Disposal

	Estimated			Unit		Capital
Cost Component	Quantity	Unit	Φ.	Cost	Φ.	Cost
4. Stone/Hay Bale Check Dam	20	EA	\$	100,00		2,000
Subtotal	<u> </u>				\$	49,358
VI. Special Construction						
1. Area C						
Clearing	3	AC	\$	3,489.00		10,467
Excavator	50	HR	\$	124.00		6,200
Haul/Dispose Debris Offsite	350	TON	\$	60.00	\$	21,000
2. Area F						
Hydroseed	441	MSF	\$	49.00	\$	21,626
Groundwater Monitoring Well Extension	9	EA	\$	500.00	\$	4,500
4. Shoreline Stabilization	1,000	LF	\$	582.00	\$	582,000
5. Wetlands Mitigation: Areas B & D	2.6	AC	\$	25,000.00	\$	64,739
Spread/Compact 6-inch Gravel Surface (Access Road Improvements)	6,667	SY	\$	5.00	\$	33,333
Access Road Woven Geotextile	60,000	SF	\$	0.24	\$	14,400
Subtotal						758,265
VII. Landfill Gas Collection Monitoring						
Installation of Gas Monitoring Wells	5	EA	\$	3,000.00	\$	15,000
Subtotal					\$	15,000
SUBTOTAL - CUMULATIVE CAPITAL COSTS					\$	2,310,000
VIII. General Requirements 1. Payment & Performance Bonds				2%	\$	46,200
Mobilization/Demobilization Heavy Equipment	12	EA	\$	2,500.00	\$	30,000
3. Insurance				2%	\$	46,200
4. Jobsite OH and profit				10%	\$	231,000
Subtotal					\$	353,400
TOTAL - CUMULATIVE CAPITAL COSTS					\$	2,660,000
Construction Management & Engineering				5%	\$	133,000
Health & Safety (Level D)				10%	\$	266,000
Contingency				25%	\$	665,000

Patuxent River Naval Air Station, Sites 1 & 12 Feasibility Study

<u>Alternative 2</u> - Institutional Controls and Long-term Monitoring; Installation of a Soil Cover over Areas B, and D; Excavation of Debris and Contaminated Sediment from Area C; and Off-Site Disposal

	Estimated		Unit	Capital Cost	
Cost Component	Quantity	Unit	Cost		
TOTAL - CAPITAL COSTS				\$	3,720,000
IX. Annual Expenses (O&M)					
Groundwater Monitoring (annual)					
Cost per Sample, Including Reporting (SL)	22	SL	\$2,000	\$	44,000
2. Gas Monitoring					
Cost of Sampling per Well/Structure (W/S)	10	W/S	\$50	\$	500
2. Routine Maintenance and Repair					
Mowing	28.9	AC	\$25	\$	723
Fertilization	28.9	AC	\$50	\$	1,447
Reseeding	28.9	AC	\$100	\$	2,894
3. Site Inspection	1	LS	\$2,000	\$	2,000
Stormwater Management System Maintenance	1	LS	\$5,000	\$	5,000
GRAND TOTAL ANNUAL				\$	56,564

Notes:

Construction cost estimates are not discounted because the construction work will be performed in the first year. O&M costs are reported as present worth estimates given a 5% discount rate for a 30 year duration. Cost estimates am based on estimated quantities which may be refined when the remedy is designed. Cost estimates are within +50 to -30% accuracy expectation.

AC = Acre

CY = Cubic Yard

EA = Each

HR = Hour

LF = Linear Foot

LS = Lump Sum

MSF = 1000 Square Feet

SF = Square Feet

SL = Sample

SY = Square Yard

TON = Ton

W/S = Well/Structure